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(*Forming* Vol. III. *of the Third Series.*)

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BY J. C. LOUDON, F.L.S. H.S. &c.

AUTHOR OF THE ENCYCLOPÆDIAS OF GARDENING, OF AGRICULTURE, AND OF COTTAGE, FARM,
AND VILLA ARCHITECTURE, AND OF THE ARBORETUM BRITANNICUM AND
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The Summary for the Year 1843 is unavoidably postponed, on account of the illness of the Conductor, who hopes he may be able to give it early in the year 1844.

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acaúlis ⚘ △ Cashmere - - 445

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CANDO'LLEA
tetrándra ♣ └┘ Swan River - - 614

Winteràceæ.

ILLI'CIUM
religiòsum ♣ └┘ Japan - - 446

Caryophyllàceæ.

VISCA'RIA
oculàta ○ Algiers - - - 614

Malvàceæ.

MA'LVA
campanulàta ♧ - - - - 446

Ternstrœmiàceæ.

SAURAU'JA
spectábilis ♣ ▭ Bolivia - - 446

Malpighiàceæ.

STIGMAPHY'LLUM
heterophýllum $ ▭ Tucuman - 446

Geraniàceæ.

GERA'NIUM
eriánthum ⚘ △ California - - 447

Tropæolàceæ.

TROPÆ'OLUM
azùreum ⊥ └┘ Chili - - - 447

Oxalidàceæ.

O'XALIS
rubrocíncta △ └┘ Guatemala - 447

Rutàceæ.

ACRONY'CHIA
Cunninghàmi ♣ └┘ Moreton Bay - 447
CORRÆ'A
bícolor ♧ └┘ Hybrid - - - 447
ERYTHROCHI'TON
brasiliénsis ♀ ▭ Brazil - - 615

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ACA'CIA
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BOSSIÆ'A
virgàta ♧ └┘ Swan River - - 448
CY'TISUS
Weldènii ♣ Dalmatia - - - 615
GASTROLO'BIUM
acùtum ♧ └┘ Swan River - - 616
HO'VEA
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spléndens ♧ └┘ Swan River - - 448
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Dósua ♣ └┘ Nepal - - - 500
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OXYLO'BIUM
obovàtum ♧ └┘ Swan River - - 448
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Onagràceæ.

FU'CHSIA
alpéstris ⊥ └┘ Brazil - - - 500
exoniénsis ♣ └┘ Hybrid - - 616
spléndens ⊥ Mexico - - - 500
GODE'TIA
grandiflòra ○ California - - 500

Melastomàceæ.

CENTRADE'NIA
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MARCE'TIA
excoriàta ♧ ▭ Mexico - - 501
MEDINI'LLA
erythrophýlla ♧ └┘ East Indies - 501
PLERO'MA
Benthamiànum ♣ ▭ Brazil - - 500

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EUCALY'PTUS
splachnicárpon ♀ └┘ K. G. Sound - 616
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Passiflòreæ.

PASSIFLO'RA
actínia ⊥ ▭ Brazil - - - 501

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RI'BES
álbidum ♣ Hybrid - - - 502

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GARDE'NIA
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bícolor ⊥ └┘ Brazil - - - 503
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longiflòra ♧ ▭ Brazil - - 502

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calamifòlius .ṁ ⊔ C. of Good Hope - 617

Lobel*iàceæ.*

SIPHOCA'MPYLOS
*b*etulæfòlius .ṁ ▭ Brazil - - 617
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NEMATA'NTHUS
lóngipes ℓ ▭ Brazil - - - 619

Ericàceæ.

COMAROSTA'PHYLIS
*a*rbutöìdes ● ⊔ Guatemala - - 619
MACLEA`N*IA*
angulàta ṁ. ▭ Peru - - - 619
***R*HODODE'NDRON**
fràgrans ṁ. ⊔ Hybrid - - 619

A*pocynàceæ.*

***E*CHI`TES**
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hirsùta ɭ ▭ Organ Mountains - 620
spléndens ɭ ▭ Organ Mountains - 620

G*entià*neæ.

LEIA'NTHUS
nigréscens ⌊○⌋ Guatemala - - 620

Convolvulàceæ.

IPOMŒ`A
Tweedi*èi* ɭ ⊔ Parana - - 621
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ostrìna ɭ ▭ Cuba - - - 620

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***E*`CHIUM**
petræ`um ṁ. Dalmatia - - - 621

Solanàceæ.

***C*E'STRUM**
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SCHIZA'NTHUS
cándidus ⌊○⌋ Coquimbo - - 621
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mexicànum ⌊△⌋ Mexico - - 621

Labiàtæ.

***B*E`CIUM**
bicolor ṁ. ⊔ Abyssinia - - 622
SCUTELLA`RIA
spléndens £ ⍍ Mexico - - 622

Acanthàceæ.

ERA'NTHEMUM
montànum ṁ. ▭ India - - 622

Primulàceæ.

***A*NDRO'SACE**
lanuginòsa △ Himalaya - - 622

*Begon*iàceæ.

BEGO`N*IA*
crassicaúlis ⚘ ⍍ Guatemala - - 622
coccìnea ṁ. ▭ Organ Mountains - 622
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*Proteà*ceæ.

ISOPO`GON
scàber ṁ. ⊔ Swan River - - 623

Elæagnàceæ.

***E*LÆA'GNUS**
parvifòlia ● North of India - - 623

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***A*RISTOLO`CHIA**
gigas ɭ ▭ Guatemala - - 623

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AE'RIDES
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TILLA'NDS*IA*
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DeCandolle's Prodromus, 284.
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Dieffenbach's Travels in New Zealand, 126
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Fraser's Scientific Wanderings, 134.
Freese's Latin Governess, 314.
Glover's History and Directory of the Borough of Derby, 314.
Gutch's Literary and Scientific Register, 81.
Gutch's Quarterly Journal of Meteorology and Physical Science, 283.
Hamerton's Paper on Arboriculture, 643.
Hay's Natural Principles and Analogy of the Harmony of Form, 130.
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Jones's Designs for Mosaic Pavements, 134.
Jopling's Sketch of Furnace and Cartmel, 504.
Kittoe's Illustrations of Indian Architecture, 645.
Liebig's Animal Chemistry, 81.
Link, Klotzsch, and Otto's Icones Plantarum Rariorum, 78.
Loudon's Arboretum Britannicum, 35. 125. 673.
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Manetti's Catalogus Plantarum Cæsarei Regii Horti prope Modiciam ad Annum 1842, 643.
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Mott's Flora Odorata, 643.
Parsons and Co's. Catalogue of Trees, Shrubs, &c. 313.
Paul and Son's Catalogue of Roses, 643.
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Solly's Rural Chemistry, 282.
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Speede's Indian Handbook of Gardening, 281.
Stephens's Book of the Farm, 80.
Sutton's Culture of the Grape Vine in Australia and New Zealand, 644.
Thomas's Monuments and Chimney-Pieces, 134.
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EXPLANATION

OF

THE CHARACTERS, ABBREVIATIONS, AND INDICATIONS

USED IN BOTANICAL AND FLORICULTURAL NOTICES.

Habit.

🌳	Deciduous tree.
🌲	Evergreen tree.
🌴	Palm tree.
🌿	Deciduous shrub.
☘	Evergreen shrub.
⚘	Deciduous under-shrub.
❦	Evergreen under-shrub.
➰	Deciduous twiner, ligneous or herbaceous.
➿	Evergreen twiner, ligneous or herbaceous.
⇡	Deciduous climber, ligneous or herbaceous.
⇑	Evergreen climber, ligneous or herbaceous.
⇢	Deciduous trailer, ligneous or herbaceous.
⇒	Evergreen trailer, ligneous or herbaceous.
⤳	Deciduous creeper, ligneous or herbaceous.
⟿	Evergreen creeper, ligneous or herbaceous.
✻	Deciduous herbaceous plant.
✼	Evergreen herbaceous plant.
⫶	Grass.
♉	Bulbous plant.
⚵	Fusiform-rooted plant.
⚶	Tuberous-rooted plant.
♒	Aquatic.
♣	Epiphyte.

Duration and Habitation.

△	Perennial.
⦶	Biennial.
○	Annual.
☐	Bark, or moist, stove.
⊐	Dry stove.
⊔	Greenhouse.
⌋	Frame.
☐△	Bark-stove perennial.
⊐△	Dry-stove perennial.
⊔△	Greenhouse perennial.
⌋△	Frame perennial.
☐⦶	Bark-stove biennial.
⊐⦶	Dry-stove biennial.
⊔⦶	Greenhouse biennial.
⌋⦶	Frame biennial
☐○	Bark-stove annual.
⊐○	Dry-stove annual.
⊔○	Greenhouse annual.
⌋○	Frame annual.

Popular Character.

ag	agricultural.
cl	clothing.
clt	cultivated in its native country.
cu	curious.
cul	culinary.
de	delicate.
dy	dyeing plant.
ec	economical.
el	elegant.
esc	esculent.
fr	fruit tree.
fra	fragrant.
gr	grotesque.
m	medicinal.
or	ornamental.
p	poisonous.
pr	pretty.
rk	for rock-work.
ro	robust.
spl	splendid.
tm	timber tree.
un	uninteresting.
w	weed, abundant in cultivated soils in its native country.

Height.

flt floating.

Colour of Flower.

Ap	apetalous.
Ærug	æruginous.
B	blue.
Bd	blood.
Bh	blush.
Bk	black.
Bksh	blackish.
Br	brown.
Bri	brick-coloured.
Brsh	brownish.
Bsh	bluish
Bt	bright.
C	crimson.
Cæs	cæsious.
Ch	chestnut.
Ci	citron.
Cin	cinereous
Cop	copper-coloured.
Crea	cream-coloured.
D	dark.
Din	dingy.
Dl	dull.
Dp	deep.
F	flesh.
Fer	ferruginous.
Fi	fiery.
Fla	flame-coloured.
Ful	fulvid.
Fus	fuscous.
G	green.
Gl	glaucous.
Go	golden.
Gsh	greenish.
Gy	grey.
Hoa	hoary.
L	light.
La	lake.
Ld	livid.
Lem	lemon-coloured.
Li	lilac.
Lu	lurid.
O	orange.
Och	ochraceous.
Ol	olive.
Oliva	olivaceous.
P	purple.
Pa	pale.
Pk	pink, or rose.
Pl	pellucid.
R	red.
Ro	rosy.
Rsh	reddish.
Ru	rufous.
Rus	russet.
Rust	rusty-coloured.
S	scarlet.
Saf	saffron.
Sil	silvery.
Smo	smoky ash-colour.
Spot	spotted.
St	striped.
Str	straw-coloured.
Su	sulphur.
Tan	tan-coloured.
Taw	tawny.
Test	testaceous.
Tran	transparent.
Umb	umber-coloured.
V	violet.
Va	variegated.
Ve	vermilion.
Vy	veiny.
W	white.
Wsh	whitish.
Y	yellow.
Ysh	yellowish

Native Country.

C. G. H.	Cape of Good Hope.
E. Ind.	East Indies.
N. Amer.	North America.
N. Eur.	North of Europe.
N. Holl.	New Holland.
N. S. W.	New South Wales.
S. Amer.	South America.
S. Eur.	South of Europe.
V. Di. L.	Van Diemen's Land.
W. Ind.	West Indies.

Propagation.

B	by budding.
C	cuttings.
D	division of the plant.
G	grafting.
I	inarching.
L	layers.
Ls	leaves.
O	offsets.
R	division of the root.
S	seeds.
Sk	suckers.

Soil.

aq.	watery places.
co.	common garden soil.
c.p.	common peat or bog.
h.	heavy rich clay.
h.l.	heavy loam.
l.	loam.
l.p	loam and peat, most loam.
lt.	light vegetable soil.
lt.l	light loam.
m.s.	moist soil.
p.	peat.
p.l.	peat and loam, most peat.
r.	rich garden soil.
r.m.	rich mould.
ru.	rubbish.
s.	sand.
s.l.	sandy loam.
s.p.	sandy peat.
s.p.l.	sand, peat, and loam.

The systematic names of plants are accented as in the *Hortus Britannicus.* The derivations of the genera are given, and the specific systematic names literally translated, any explanatory words accompanying such translation being printed in Italic. Those names, whether of genera or species, which are commemorative, as Bánk*sia* in honour of Sir Joseph Banks, are distinguished by having the subjoined letters in Italic where the rest of the word is in Roman, and in Roman where the rest of the word is in Italic, as *Bánk*sia; those which have been applied to plants by the classic writers of antiquity are distinguished by having the initial letter in Italic, as *P*ỳrus, where the rest of the word is in Roman, and in Roman where the rest of the word is in Italic, as P*ỳrus.* All words, generic or specific, of unknown derivation, or aboriginal names, are wholly in Italic or wholly in Roman, according to the letter in which the preceding or following matter may be printed, as Pædèria *Lingun* Boj., or *Pædèria* Lingun *Boj.*

THE
GARDENER'S MAGAZINE,
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ORIGINAL COMMUNICATIONS.

ART. I. *On the Theory of Manures.* By R. LYMBURN.

THE year 1842 has been distinguished by a vast variety of efforts to elucidate the subject of manures; and the many tables published, opinions given, and experiments recorded, have added immensely to the bulk of information from which rules for practice must ultimately be deduced. That much disappointment and many unaccountable results have been produced should not damp our endeavours. The difference of soils has a great effect in producing these: they vary so much in their physical properties, both naturally and artificially, that experiments will require to be often and carefully repeated on different soils, in different seasons, and on a large scale, before they can enable us to form rules for our guidance in practice. A soil naturally porous will produce very opposite results from a sodden stiff soil, and will require very different treatment; if this be neglected, or interfered with by accident, the result may differ very much from expectation. If the season is likely to be wet and cold, the porosity should be encouraged; if dry and warm, the ground should be rolled and compressed; this may be omitted, or the weather may be so very dry that the crop may fail even although this is attended to. If the soil is cold and wet, it may be much improved by cultivation. The skilful cultivator will take advantage of tids of weather, and may make frost, drought, and even wet, assist in pulverising and producing that great requisite, a plentiful supply of moisture to the roots, absorbed from the small pieces of the soil, without an overdose to gorge up the channels of communication between the air and soil. Dry hot manures, strawy and turfy, suit wet soils generally best; and cold wet manures the dry soils. But seasons may reverse this order. In cold wet summers, dry hot manures may do best even in dry soils; while heavy wet land, if worked wet in spring, and a dry summer succeed, may be so coarse in the pieces, so open and porous, as to be benefited most by cold wet manures. It makes no odds how much, and how usually powerful, may be the manures deposited in the soil, if chemical action is not kept up in the soil, the stomach of the plant, both by the free admission and retention of heat and air. We may have much greater produce from a small quantity of manure under judicious cultivation, than from a great quantity when, by improper cultivation, or by those baffling tids of weather which occur so often to paralyse the efforts of the most skilful, the soil has got out of order. It is difficult to lay down rules stating how much should be ascribed to all these causes; the skill acquired by practice, and great observation and discrimination, with repeated trials on a large scale, will all be needed to elucidate and harmonise conflicting statements. There are particular periods in the stages of existence of plants also, when nourishing weather is more requisite, and the reverse does more harm; as in turnips, carrots, &c., newly above ground, when, if they are stunted and set up, no after nourishing weather will altogether remove the defect; or in grain crops at the time of setting the flower, in potatoes at the time of germination, &c. The different kinds of manure, also, differ very much; some requiring much more chemical action to render them soluble than others.

In experiments, also, conducted on a small scale, on small measured portions of ground and manure, allowance must be given for variations in the state of the soil, at very short distances, in the same field. Where immense level plains or mountainous tracts of great extent occur, the soil is more uniform; but where the land, as in many districts, is undulated through its whole extent, with hill and vale, knoll and hollow, it is found that different portions of a field, within a few yards or even feet of each other, differ much in many respects. One piece, having a stratum of gravel running through it, may be parched and burned up with drought in a dry season; while in a wet season it may retain only its proper quantity. Another piece may be stiff sodden clay, suffering much when the seasons are wet and cold at the time of working, and greatly improved by working dry, and having moist weather afterwards. Another portion may have once been wet and marshy, and accumulated a kind of peaty deposit, which, if drained afterwards, may bear fine crops in ordinary seasons, but will suffer in the extremes both of drought and wet. The field may have had an excellent soil some feet deep deposited on it, but the good soil may have been washed away from some pieces by partial floods, and a stiff obdurate clay exposed: or the reverse may have taken place; the good soil may have been washed from the hills and knolls, and deposited in the hollows. All these varieties occur in the district around this, frequently in the same field. The prevailing rocks are sandstone and greenstone, above the coal measures; and the varieties produced by the mixture of these are immense.

One end of the seedling beds, along a whole quarter of the garden, may be of a loose friable, though loamy, nature, suiting most seasons well; while the other end of the beds may be found of a stiff retentive nature, which hardly any season is found to suit, yielding scarcely any crop in comparison, though covered with double the quantity both of manure and seed; yet at times, by the agency of frost, with dry digging and pulverising, these same ends may, in some seasons, be nearly equal to the other. Many districts also, from the prevalence of moor land, and the want of plantations to shelter, are much colder than others in the neighbourhood more favourably situated. Some hills slope to the south, and others to the north; some abound in inequalities, while in others the slope is regular. Fields, and pieces of fields, and gardens will also differ much, as to the quantity of organic remains left from previous crops, or deposited from the roots, or accumulated by accident. The mechanical state will also differ much, from portions being dug for the previous crop in wet or in dry weather, from trenching, draining, &c.

When so many causes are at work, which may all at times affect the results of experiments, we must not be discouraged though we do not get exact comparative results from measured portions of soils and manures; and be content, if, from a great variety of experiments carefully observed in all their bearings, on various soils, in various pieces of the same field or garden, and in various seasons and circumstances, the truth should after all begin to emerge. If these experiments give rise to theoretical opinions for which the reasons seem well grounded, and if these theoretical opinions are confirmed by future practice, a solid basis may be built, by the united aid of science and practice, which neither the one nor the other could, of itself, have so perfectly attained. The subject must be thoroughly investigated in all its bearings; and, however many deceive themselves or succeed in deceiving others, it can only be for a time. Practice will banish false theories and establish the truth, if properly and unprejudicedly observed. We must not be hasty in our conclusions, and must take proper observation of the soils experimented on, the circumstances they are placed in, the nature of the seasons, and how all these bear on one another, and may be calculated to affect or be affected by the substances deposited as manures. When practical men, generally, get so far versed in the elements of science as to enable them to follow out all these subjects in all their bearings, an immense power of observation will be brought into action, and must ultimately be productive of vast benefit.

It has been attempted to simplify the subject, by selecting some one of the constituents of manure as the most essential. Of the four principal and most abundant elements, hydrogen and oxygen being got from the water absorbed, and carbon partly from the air and partly from the soil, and not yet properly decided how much from each, *nitrogen* has been selected. Being generally found in combination with carbon and other substances needed as food, being necessary in the transformations carrying on in the circulating sap, assisting greatly in all the fermentations of manures, and being always found in greatest quantity in the spongioles of the roots, and in the young shoots and leaves, wherever vitality is most active, it has, though small in amount as a constituent, been found very important. It has not been found, however, that manures always produce results in proportion to the quantity of nitrogen they contain, nor that crops exhaust the fertility of the soil in the ratio of the quantity of nitrogen they take from it. It has been found, also, that great effects have taken place from an augmentation in the usual quantity of the inorganic saline substances of manures; and hence nitrogen, though perhaps the most essential ingredient taken by itself and with regard to its combinations, yet cannot generally be taken as an exact measure of value for the whole.

Dr. Madden, in his Essay published in the Highland Society's Transactions (*Quarterly Journal of Agriculture*) for June last, takes a more extended view of the subject, and proposes to compare the value of manures by—

1st. The quantity of soluble matter present.

2d. The facility with which those portions at first insoluble can be rendered capable of solution by the process of decay.

3d. The quantity of azote (nitrogen) they contain.

4th. The whole quantity of organic matter possessed by them.

5th. The quantity of inorganic matter which each contains, possessing the same constituents as the ashes of the crop to which it is applied.

Bone dust he finds, by analysis, to contain of

Water		11·5
Organic matter, with some saline materials	soluble in cold water	4·7
	— in hot water	5·5
	— in a weak solution of potass	26·0
	— in a strong ditto	15·5
	driven off afterwards by heat	6·0
Phosphate of lime		28·0
Carbonate of lime		2·8
		100·0

Farm-yard manure, the average of several analyses:

Water		45.535
Organic matter	soluble in water	10·75
	— in potass	14·25
	driven off afterwards by heat	18·565
Salts of potass of soda of lime of silica		7·9
Earthy phosphates		3·0
		100·0

In comparing them together, he finds

	Bone Dust.	Farm-yard Manure.
Water	11·5	45·535
Total organic matter	33·5	33·565
Soluble matter	10·2	10·75
Easily dissolved matter by caustic potass	41·5	14·25
Earthy phosphates	55·0	3·0
Saline matter	55·0	10·9
Azote or nitrogen	1·77	·45

the phosphates in the analysis of bones having been partly contained in the easily dissolved matter.

He next compares them as to the quantities of the respective matters found in each, showing that the total organic matter and soluble matter are nearly alike: but that, as compared with farm-yard manure, there is contained in bones, of

Easily dissolved matter	2·9 times the quantity.
Earthy phosphates	18·3
Saline matter	5·
Azote	3·9
	30·1

Thus chemical analysis shows, he says, that 1 ton of bone dust is equal to 30 tons of farm-yard manure. The same mode of analysis is also pursued with rape dust, 1 ton of which is made equal to 18½ tons of farm-yard manure; and, as this nearly agrees with what is generally considered the ratio in practice, he considers that practice thus confirms scientific results.

In the above analysis, however, the phosphates are made to perform a double part, being compared, as to their action, both as phosphates and saline matter. The soluble matter in farm-yard manure, also, should have been 43·565. If these had been properly attended to, the result would have been much less; probably nearer the true amount as regards practice, which he states himself at 15 to 20. It may also be matter of doubt, that, though a certain quantity of phosphates and other saline matters is needed, we are therefore entitled to affirm that every addition to the quantity of these will produce a corresponding result. Certain quantities are needed as constituents; and, when they are abundant, the plenty of materials may produce more action. Another portion, not so easily estimated, may be needed to act chemically in the soil, in preparing the food, and in the transformations going on in the vital juices to fit them for the assimilating organs. It may be well to provide abundance; waste in these does not take place so readily as in nitrogen and carbon, but there will be a limit. If, however, we had many careful analyses of the different species of manures, conducted in the same way, they would come ultimately to be of great benefit, in enabling practical men to know, when there was a deficiency of ordinary manure, how much of the other substances should be added to make up the deficiency. When manure is required to be carried to great distances, a considerable saving of expense might be found to result from using the more concentrated manures. Peaty soils, or those abounding in brushwood, turf, leaves, branches, &c., producing carbon, are often situated at a distance from towns; and concentrated, nitrogenous, and saline manures might be carried there at much less expense. If tables were once furnished of the quantities of all the different substances drawn off by the different crops usually cultivated, and of the capability of the different manures to supply these, such as those now publishing by Professor Johnson in his *Lectures;* and if such tables, carefully made out, and corrected by separate analyses of plants grown in different soils and climates and in different seasons, and of manures in different stages of decomposition and in mixtures, were compared and digested; they would furnish data to enable the practical man to know, in all circumstances, how to proceed, how to supply deficiencies in manure, how to make up for exhaustion, and keep his ground properly supplied with food, so that his crops might be duly benefited by the blessings of Providence in sending good weather. To expect exact mathematical results, where so many contingencies are at work, might be Utopian; but something sufficiently near the truth may be hoped to be arrived at, so as to save a vast deal of expense, and greatly increase the value of produce. When substances are deposited as food, without a knowledge of their contents, or the requirements of the plants they are intended to feed, it is going blindly to work, and leaving to hazard what it may be in our power to provide against.

In endeavouring to elucidate the progress made in arriving at correct theoretical views on the action of the different *indi-*

vidual substances forming the food of plants, or assisting in rendering that food available in increasing the produce of plants, the importance of *nitrogen* to both plants and animals, though undoubtedly sometimes overrated, entitles it to a prominent share of attention. It is the basis of fermentation, which cannot be carried on without nitrogen, whether we may reckon it the fermenting principle itself, or, as some, the food of the fungi which carry on fermentation. It appears that, as in the food of animals the necessary quantity of nitrogen is so mixed up with their ordinary aliment, that in attaining it the other substances, viz. the carbon, hydrogen, oxygen, and saline earthy matters, forming the structure of the body, follow of course; so in plants, when we deposit their food in the soil, the stomach of the plant, it is generally, as in farm-yard manure, a mixture of different substances containing all the elements requisite to build up the structure of the plant, and assist the vital energy of the system in the chemical changes necessary to enable the several organs to perform their functions. Nitrogen forming a constituent, less or more, in all plants and all the parts of plants, especially the youngest and most active parts, and being found in much greater quantity in animals, from the carbon given off by respiration, a mixture of these substances, especially when containing a due proportion of the latter, will always be found, along with the nitrogen, to convey the other substances wanted. It is probable, also, that, even in the function of absorption, the most essential elements are intimately united; the humate and carbonate of ammonia, apparently the greatest source of food to plants, furnishing the carbon and nitrogen, combined with water (or hydrogen and oxygen), the most essential elements of plants.

In the excellent papers lately published in the *Gardener's Chronicle* from Professor Sprengel, whose great eminence in his profession seems properly united to an intimate acquaintance with practical cultivation (a most essential requisite in bringing science to bear on practice), the benefits of humus have a very important station. In all the mixtures he recommends as necessary to prepare manures for becoming the food of plants, he gives humus a preference, as the most essential requisite in preventing the evaporation of ammonia, and retaining it in the compost in the state of humates and carbonates of ammonia. Even in the solution of bones, humus is the article he recommends, as both rendering the phosphates soluble by the humic and carbonic acid it furnishes, and at the same time absorbing the ammonia of the cartilage. It appears from his practice, that, where sufficient vegetable remains have been mixed with the animal substances usually employed as manures, the humus has been found sufficient to retain, not only the ammonia; but also the phosphuretted and sulphuretted hydrogens, of the composts. Dr. Madden, as we noticed in our former essay, considers ammonia as the greatest solvent of humus, and the way in which the principal part of the carbon and nitrogen of the plant is furnished. It is true that this is also doubted by such eminent men as Liebig, Johnson, and Schlieden, the great liability of the humates to decomposition seeming to be one of the principal objections; but if formed by the every-day action of the manures in the soil, and carried to the roots of plants, their liability to decomposition, if once absorbed, may be a benefit in place of the reverse, and may account for one of the principal objections of Liebig, that humates, or humic acid, are not found to descend to any great depth in the soil.

Nitrogen being so indispensable an article; being necessary, according to Dumas, in forming the fibrin of which all the vessels of plants are composed; being deposited in the form of diastase, gluten, and albumen, wherever food is stored up for the future use of the plant; and, by its action in the form of ammonia, which is largely formed in all young shoots wherever life is most active, probably assisting in the chemical changes necessary to prepare the food for the vital organs; it is of great consequence to know whether the food we administer contains this valuable substance in proper quantity. Being exceedingly volatile in the caustic state of ammonia, it is of great importance to prevent evaporation as much as possible; and, if deposited in composts containing humus or vegetable remains in a state of decay, it is reckoned by some sufficient to prevent escape, and will be united to another essential element of vegetation, thus simplifying and rendering more intelligible the feeding of plants. Such as do not believe in the power of composts to absorb and retain ammonia, and such as dwell in large towns where composts are not so easily to be had, use a variety of substances to fix the ammonia by uniting it to some more powerful acid, of which the best and most economical appears to be sulphuric acid or vitriol.

As to the comparative quantities of nitrogen in crops and manures, Dr. Madden, in his Prize Essay on Physiology and Chemistry applied to Agriculture, published in the *Highland Society's Transactions* for March last, reckons that in a four-course rotation of 30 tons of turnips, 42 bushels of wheat with 2000 lb. of straw, 200 stones of hay, and 48 bushels of oats with 2500 lb. of straw, which the four years would furnish from an acre of ground, there would be produced and carried off, in all, about 8183 lb. of carbon, 248¼ lb. of azote, and 1190 lb. of saline matter. The manure, at the rate of 30 tons of farm-yard manure, deposited in the soil as a preparation for the turnips, he calculates at 12,730 lb. of carbon, 280 lb. of azote, and 6104 lb. of saline matter. We thus find that while the manure provides half as much again carbon as needed, and five times the quantity needed of inorganic matters, there is not above $\frac{1}{12}$ part of an overplus in the nitrogen, to allow for what may never reach the roots of plants (being carried off by evaporation or washed away), and for the ammonia which circulates in the vital juices, assisting in the transformations needed to prepare the food for assimilation, and stimulating the activity of the vital principle. Wherever nitrogen is furnished in abundance from the substances deposited in the soil as food, whether in the form of ammonia or nitrates, the plants are found to assume a dark green healthy appearance; the evidence, well known to practical men, of luxuriant vigour of growth, this colour being always assumed in the healthy condition of the plant; though perhaps the alkaline effect of the ammonia on the chromule of the leaf may only denote its presence, and the capability of action, other circumstances being favourable, as the colour has been sometimes found to appear, without the usual consequences of luxuriance in growth following. It might be more beneficial, when the manure is compounded of substances not known to abound in nitrogen, to make such as potatoes, containing little nitrogen, to precede wheat. The analysis of turnips, as given by Professor Johnson in his *Elements*, would cause a greater quantity of nitrogen to be suspected in the rotation than that of Dr. Madden's statement. He states the gluten and albumen in 25 tons of turnips at 1400 lb.; according to Dr. Prout's estimate of 15·55 per cent, about 217¾ lb. of nitrogen. Boussingault's estimate of ·17 per cent of azote in the turnips would make only about 95 lb.

When the nitrogen of manures is so small in comparative amount, it seems to strengthen the opinion that part of this also is got from the air. Some crops, undoubtedly, derive a great portion of their nitrogen from the air. Boussingault has found it so in Jerusalem artichokes; a more familiar instance, however, is to be found in the bean, which, in an average crop, carries off a great deal more of nitrogen than wheat, and should proportionally exhaust the fertility of the ground in a greater degree; yet, while the wheat is one of the most exhausting crops we have, the bean is rather a fertiliser. The oat also is a very exhausting crop, and contains still less nitrogen than the wheat. The crops of oats which follow beans are more luxuriant than ordinary, as if the bean had been depositing rather than extracting nitrogen. If Professor Johnson's estimate of the quantity of nitrogen carried off by turnips be correct, it is another instance of ground being fertile after what should have been a scourging crop. If nitrogen is got wholly from the soil, crops should impoverish the soil according to the nitrogen they extract. Many plants which are found to abound in fungi at the roots must excrete a great deal of nitrogen by the process of exosmose, fungi being well known to be voracious of nitrogen for their food. Horse-dung contains about the double of the nitrogen that cow-dung does, yet most crops and most soils are more benefited by the latter than the former. Some crops, as wheat, are found to have gluten deposited in greater abundance in the ear, when manures have been furnished abounding in nitrogen; the proportion of gluten to the starch being much greater. But when manures containing much nitrogen are applied to oats and barley, the gluten is not increased there as in the wheat. All these circumstances seem to point out that there is not always a regular ratio between the nitrogen deposited in the manures, and that carried off in the crops; and that nitrogen is got in some way not yet understood. It is probable, though not hitherto admitted, that, as plants contain a system of air vessels by which the air containing the greater part of its volume in nitrogen is constantly brought into contact with the circulating juices of the plant, ammonia may be formed from the newly liberated or nascent hydrogen, developed in the transformations of the circulating sap, coming in contact with the nitrogen of the air, perhaps also recently deprived of its oxygen by absorption, which is well known to take place. The carburetted hydrogen of the air, stated by Dumas as equal in quantity to the carbonic acid, and the sulphuretted hydrogen lately found so beneficial by Mr. Solly, may, perhaps, also furnish hydrogen to the plant to assist in the formation of ammonia. The nascent nitrogen from the air, deprived of its oxygen, and confined in the vessels of the plant, if it come in contact with nascent hydrogen there, should be as capable of forming ammonia in that situation as in the manure heap. That plants do get nitrogen, under a form capable of assimilation, in this or some such manner, is evident from their producing it in greater quantity than the ammonia from manure, or that from the air in rain-water to the roots, could be capable of furnishing. It has been generally said by our most scientific writers, that the ammonia is wholly got by the roots: the experiment of Mr. Milne, however, lately narrated in the *Gardener's Chronicle*, in which, having hung up tin cans containing ammoniacal liquor, and sprinkling it on the floor of a vinery, he found, in 48 hours, the leaves to assume a dark green appearance, and the after-growth to be exceedingly luxuriant, is, I should think, sufficient proof that leaves absorb ammonia from the air when they fall in with it. That nitrogen is not wholly from that provided in the form of ammonia to the roots is evident; that some plants get it from the air, and that probably all have partly that power, seem also evident: the exact tabular data of the quantities in crops and manures may not, therefore, be a perfect guide, and we may not always reap benefit in proportion to the quantity furnished; yet, generally speaking, manures containing much nitrogen are found to have a powerful effect; the exceptions will be best learned by practice.

As urine, and other liquid drainings of the farm-yard, and those furnished domestically, which are so rich in nitrogen, are too frequently allowed to run to waste, the necessity of collecting these substances and depositing them in the compost heap, with plenty of humus earth, which in many places abounds to so great an extent, cannot be too much inculcated.

Peat earth is plentiful in many situations, and has long been known as capable of fermenting and becoming as good as manure, if mixed with it. Sawdust of deciduous plants (hard wood) rots also, and is good for composts; that of fir wood is found to decay very slowly, from the insolubility of the resinous substances, which might, perhaps, be helped to dissolve by mixing with the alkalies of wood-ashes, in which they are soluble. Where leaves can be collected, and clippings of hedges, they are excellent for composts; also the stems, leaves, and roots of garden plants and weeds, in fact all the haulm and refuse of the garden. The straw of grain crops, the stems of potatoes, turf, and scourings of ditches (avoiding those places where there is much deposit of iron from the water), are all capable of yielding humus to the manure heap. Even the roots of couch grass, and other root-weeds, if well fermented, are capable of adding to the bulk and value of the manure heap; and almost all vegetable and animal refuse, which cannot be more beneficially employed. They should all be collected, a layer of these substances and earth put below, and alternate layers of hot fermenting dung and these put together, watered if needed, and too much wetness thrown off by coverings open at the ends and sides. There should be most of the humus earth in the bottom and around the outsides, the fermenting substance will not then escape so much. A proper state as to moisture, neither too wet nor too dry, is very necessary to be attended to, substances being found to putrefy incomparably more quickly when moist, than either wet or dry. Heat should be encouraged by loose strawy matter, to allow the admission of air, and when too great the heap should be turned over to allow it to cool. When too loose and dry it burns and gets white, and a proper degree of consolidation and moisture is necessary. The drainings of the dunghill should not be encouraged by too much wetness being allowed to fall on the heap, but provision should be made for collecting all that comes away, and throwing it on again, adding a little more earth and haulm if necessary. All the urine, night-soil, soap-suds, soot, and all the domestic refuse, should be carefully added to the heap; the coal-ashes, unless sifted to a small powder, being kept by themselves. Sea-weed, when to be had, is an excellent ingredient in such composts; and all brush-wood, furze, &c., chopped small. All animal remains, refuse of fish, hair, wool, rags, horn, bruised bones, and all refuse of the kind, should be carefully collected: animal remains are the richest in nitrogen. To a mixture of the above substances, half the bulk of manure when coarse, and about ¼ or ⅓ when more concentrated, should, when rotted together, be equal in value to the same bulk of rotted manure; preventing the loss in the way manure is generally managed, and increasing the quantity in an immense degree. When the heap is near the field less dung may suffice to mix, but when it is to be carted far it should be rich, to save expense; the heap ferments more perfectly with a good proportion of hot manure. For such as root-weeds and seeds of weeds, there must be a hot fermentation to destroy them. When there is not much stable manure to mix with the compost, a mixture of wood-ashes, lime, and other substances yielding alkalies, is very beneficial, in causing the production of humic acid, forming humates with the alkalies in place of carbonic acid. Where much ammonia is in the compost, which will be the case wherever animal remains and excrements abound, lime is apt to cause the escape of ammonia, by decomposing its carbonates and humates; and only so much should be used as will saturate the surplus of humic acid not taken up with ammonia. Sprengel recommends about $\frac{1}{16}$ for some composts; too much should, above all, be avoided. When sulphate of lime, sulphate of soda, and muriate of soda (salt), are cheap, they will be useful to add. The refuse of glue manufactories is rich in nitrogen. The refuse of woollen factories is rich in soap-suds, urine, &c. The refuse of tanners and skinners, the hair, skin, wool, and hoofs, is rich in nitrogen. The refuse of gas-works is well known as beneficial.

As regards the way in which carbon, forming the greatest proportion of any of the elements in plants, is obtained, there is still very considerable difference of opinion. As we noticed in former essays, Professor Liebig is of opinion that most, if not all, is got by the leaves from the air; while Professor Schlieden, one of the most eminent physiologists of the day, in a criticism of the *Chemistry and Physiology applied to Agriculture*, of Liebig, (translated into the *Gardener's Chronicle*,) seems to be of a completely opposite opinion. The action of leaves on a growing branch confined in a vessel filled with air, in which it has been said the carbonic acid has, after a time, been found diminished and the oxygen accumulated, has always been brought forward as proof of the fact that plants get most of their carbon from the air. These experiments, however, are difficult to manage so as to prevent error; and Schlieden asserts that, in the average of recorded experiments, it has been found that the enclosed air of the vessel has neither been altered in its quantitive nor qualitive relations. Dumas expresses himself hesitatingly on the point, and, though he leans to the supposition of the carbon being got principally from the air, and undoubtedly, he thinks, from carbonic acid, yet notices the great quantity of carbonic acid found by Boucherie to issue from the trunks of divided trees when felled in full sap, evidently derived, he says, from the roots. Professor Johnson seems to lean to the supposition that the greater part is from the air. Professor Sprengel and Dr. Madden seem to be of opinion that the greater part of the carbon is got in the humic acid absorbed with the ammonia: the latter allows that very little of the carbon is got in the state of carbonic acid by the roots, while many are of opinion that what is got by the roots is principally in that form. I shall have an opportunity of entering more at length into this subject in the article "Vegetable Physiology." While so much difference of opinion, however, prevails among learned men on the subject, practical men will do well to preserve and deposit in the soil the carbon, as well as the other portions of the manure. Fortunately, in the mixed manures generally applied, there are carbon, nitrogen, and inorganic matter; and in most soils, though not all, as asserted by some, there is generally a reserve of humus to assist when neglected. I doubt it would be found very difficult to grow plants luxuriantly in washed sand, with either ammonia or saline matter, or both, in an ordinary atmosphere. Such an experiment, however, might throw more light on the subject than most of those tried. Solutions of nitrates, sulphates, and phosphates of ammonia, potash, soda, lime, and magnesia, with silicates of potash and soda, and a little common salt, would furnish the nitrogen and inorganic substances wanted; but, I fear, would not produce luxuriance of growth without carbon.

On the subject of *inorganic* manures, the experiments recorded this season are manifold, and, as might have been expected, much at variance. Some applications, in certain circumstances, appearing to have had little effect; others to have done much good, and some to have done harm. The tables furnished of the quantities of these substances found in the different plants under cultivation, and the quantities furnished by the different kinds of manure, will, when properly regulated and corrected, show what are the wants of plants as to constituents, and how far the food deposited is capable of supplying these wants, a proper allowance being given for the portion washed away from soils; but there is still more to be done before correct data can be furnished. It is evident that saline substances are wanted for other purposes besides forming constituents. The quantity found in the young branches and leaves of trees is great, in comparison with what is found in the trunks; the quantity found in trees is comparatively much less than that found in annual crops; and the quantity in these is also much greater in the young succulent growing portions, than in the ripened tissue. These facts all show that a liberal comparative supply is needed for the young growth, teaching the necessity of applying these and ammonia early to young seedling plants; and also teaching that these substances are necessary to assist in the transformations going on where life is most active, to fit the circulating juice for the purposes of the organs of assimilation, and that, where extra vigour is wished, a liberal supply of these substances must be furnished. The effects of this supply may be observed, wherever the burnt ashes of young unsaleable trees, or the clippings of hedges, have been applied to vegetable crops; I have seen the effect often such as to defeat the end intended, by an over-luxuriance of stem and leaves to root crops.

I have seen very powerful effects, this season, follow the mixing of composts for pots with ashes of small branches burned and bruised to small pieces. At Roselle, the geranium leaves were like those of tussilago for size, of a deep green, and the vigour of growth so great as to injure the flowering. The excellent preparation of branches, straw, cabbage leaves, and other haulm, set fire to and kept at a smothered heat till charred, as pointed out in the November Number of the Magazine by Mr. Barnes of Bicton Gardens, will be very powerful. The greater the variety in the small branches, leaves, roots, &c., charred, the more likely are the ashes to answer general purposes. They contain the great variety of saline substances found in the most vital portions of the plants burned, which accounts for much of their action. Leaves will not grow, nor vital activity become active, till all the essentials of vital chemistry are provided; though the compost they are furnished with contains sufficient of carbon and ammonia. The ashes, also, act mechanically, as keeping the soil open by their elasticity, which is one of the principal benefits of farm-yard manure. They also absorb oxygen and ammonia from the soil and air; or, if the oxygen is from water, perhaps form ammonia from the nascent hydrogen, and absorb it, as most oxidising substances likely do. These absorbed gases will be given off to the roots. Roots are always exceedingly fond of running round such porous substances, and are found to increase and multiply and get matted around them, which of itself must greatly assist. Whether the roots are impatient of too much moisture, or attracted by the gases absorbed as they cling round those charred pieces of wood, and of clay as in pieces of pot and brick, or whether opposite states of electricity may affect, it might be difficult to say. It is likely, however, that the absence of undue moisture, and the presence of a proper quantity of gases, form the principal cause. I have seen them cling round large pieces of porous bones with avidity, while they refused to enter the powdered small pieces of bones, where, perhaps, there was too great an abundance of food, the ends of the spongioles appearing diseased and swoln. The carbon of the ashes is also undoubtedly given off as the pieces begin to dissolve. I have seen such powder to increase greatly to appearance the growth of hyacinths in water, as compared with those in pure water; and the saline substances and carbon were likely to afford most of the benefit there.

To enable us to arrive at correct data, plants should be analysed in the various stages of their existence. The comparative analyses of plants must vary according to the age of the plant experimented on; according to the part of the plant examined also, if in portions; perhaps, also, according to the liberality of the supply furnished to the roots. What is to be allowed for constituents, and what for assistants, and what perhaps deducted for superfluity, may be very difficult to solve, and may require many analyses of scientific men, and much judicious observation of practical men, before arriving at correct principles. Superfluity is undoubtedly prejudicial; and it has been frequently proved by experience, that plants will at times absorb both more water and more food in the water than are necessary, or than the leaves can elaborate, so as to enable the organs to assimilate. As the quantity of food absorbed depends partly on the quantity of water absorbed, excess in some seasons and some soils may more readily occur than in others. In seasons when little light is present, less water is, however, absorbed, though the season should be more wet and the ground more moist; and, to a certain extent, the one is a corrective of the other: yet confusion may arise from the confliction of causes, and may baffle and retard the efforts at establishing rules; though, if we are cautious of deceiving ourselves and others with preconceived notions, and do not attempt to make practice bend to theory, it will undoubtedly in the end conduct us to the right path.

In endeavouring to ascertain from practice the necessity for these substances, by the effects produced by their application, the recorded effects of experiments are much at variance. Nitrate of soda has been found to have very different effects in different situations. This has been ascribed to the places in which it failed being near the sea coast; and, the lands abounding in salt (muriate of soda or chloride of sodium), they had therefore no need, it is said, for nitrate of soda, and hence the want of effect. At Roselle, which is so near the sea as to entitle it to the benefit of a saline atmosphere, and where common salt was found to produce no effect which might be ascribed to that cause, nitrate of soda was found to produce a powerful one. Yet even here it was found by the gardener that a small quantity killed the stool plants of sea-kale, while, at the Society's Experimental Gardens, it has been given in doses of 1 lb. to the plant with good effect. The nitric acid of the nitrate when absorbed must have a different effect from the muriatic acid or chlorine of the other. The latter are seldom found as constituents in plants, and little is known of their beneficial action; while nitric acid has been found by Braconnot to produce fibre from starch, and, if confirmed by further experience, may be found in this way to assist in performing an important part in the vegetable economy. It is also said to assist in the formation of oxalic acid, which last is thought to abound more in plants than analysis points out; the oxalate of potash being changed into a carbonate in extracting it. Like ammonia, nitric acid probably assists also, by the nitrogen it contains acting as a stimulus to growth: probably ammonia is formed from it, as it is generally found to give rise to a dark green colour, denoting the alkaline state of the chromule, an appearance which generally betokens vigour of growth, but is sometimes found to appear without this increase. When a sufficient dose of manure has been given before the dressing of nitrates, they have been often found to produce no additional effect. At Caprington this season, a lot of potatoes had been manured at the rate of about fifty cubic yards of well rotted manure (about thirty tons), and the crop produced was about twenty tons per acre, the manure and working of the land being excellent: but some drills, dressed with the usual quantities of nitrate of soda, sulphate of soda, and urate containing a great deal of ammonia, had no perceptible increase; apparently from the large quantity of ammonia supplied by the manure to a crop not carrying off much nitrogen, the substances containing it had no effect. Some nitrate of soda and sulphate of soda, sprinkled on a crop of vetches in an adjoining field, caused a great increase of produce, showing that there was nothing naturally in the soil against their acting. The many causes noticed in the commencement of this essay may have occasioned different results, and may not have been observed. Sometimes the substances lie over year in cold soils and cold seasons before producing effect; and some may have been applied unwittingly to pieces of fields which were inferior, not suiting the season. One part of the field, equally good with the other and as well manured, may fail also from tids of weather being against it, one piece being worked on a dry day, the other on a wet; one piece or one field being farther advanced than another, and not suffering so much from drought as the other, the soil being more retentive in one place, and more open and porous in another. If all these are not properly taken into account, the observation is imperfect; and some of them may, from circumstances, have eluded the observation of the most vigilant. There must be causes for every thing, but we must wade through much difficulty in arriving at them before we can furnish proper data, and must not expect mathematical results where so many obstacles, seen and unseen, are in the way.

The best experiments for ascertaining the true nature of the action of these substances are those made by Mr. Fortune in the Society's Experimental Gardens. He washed silver sand as a soil for plants, to prevent any effect from previous organic remains; and also washed the roots of the geraniums he planted in the sand. The result was, that none of the various substances he watered with in solution had any more effect than common water, except carbonate of ammonia and wood-ashes mixed, which contain the most of the constituents generally needed in plants. In some potted in common soil, the other substances produced the usual effect. Before any action can take place, it is evident that real food containing all the constituents of plants must be supplied from some source, and these substances will always be most generally valuable. Such as sulphuric acid, which is found only in very small quantities, unless in some particular kinds of plants; and such as muriatic acid*, of which only a trace is to be found; must be much less needed than carbonic acid, and must act principally by their influence on the constituents of food, either in the soil before absorption, or in the transformations going on in the plant. Such bases as iron are prejudicial, unless in very small quantity; such as magnesia and alumina are very little needed as constituents, and must be sometimes hurtful in excess. Potash is most prevalent in all parts of the plant, and should, therefore, be most beneficial. Lime is found in greatest proportion in the stem, and should be most beneficial to the growing plant. Soda is found most in seeds, and should be most useful at the time of ripening. It is evident, also, that such as soda cannot be so much needed, as a constituent, as potash; though, as a solvent, it is more powerful. Nitrate of soda has been very beneficial to onions this season; its deliquescent property of extracting water from the air may be useful in a dry season. As a knowledge of these things spreads, it may conduce to economy to employ them only when needed; and the object of fruitfulness may be secured at much less expense.

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* The experiments of Mr. Solly on muriatic acid, lately recorded in the *Gardener's Chronicle*, show that, so far from being injurious, as formerly supposed, and poisonous to plants, he found it beneficial, even in pretty large quantities. He found it, also, to have the effect of requiring much less water to the pot the plant experimented on was growing in; the usual perspiration of the plant being much checked, either by the stopping of the pores, or preventing the extrication of water chemically. Some pots naturally require much more water than others, but this is likely to have been observed. Acids, generally, are prescribed to check perspiration in human beings; if acids have the same effect on plants, it may be found another circumstance requiring attention. Such an action cannot, certainly, be generally beneficial.

ART. II. *The Roller called Pica marina in Italy.* By CHARLES WATERTON, Esq.

> "I love to see the little goldfinch pluck
> The groundsel's feather'd seed, and twit and twit;
> And then, in bower of apple blossoms perch'd,
> Trim his gay suit, and pay us with a song.
> I would not hold him prisoner for the world." HURDIS.

I KNOW nothing in the environs of Rome half so grand and charming as the ornamented grounds of the beautiful villa Pamphili Doria, the gates of which are always opened to the public. A blessing be upon the head of its princely owner, for this prized permission to the world at large! May his liberality never suffer by the hand of wanton mischief, or ever be checked by the presence of a rude intruder! Many a time, when fairly tired with the never ending scenes of painting and of sculpture within the walls of the eternal city, have I resorted to this enchanting spot, here to enjoy an hour or two of rural quiet, and of purer air: and, could I have had a few British gardeners by my side, the enjoyment would have been more complete; for gardeners in general are choice observers, to them

> ——— "Not a tree,
> A plant, a leaf, a blossom, but contains
> A folio volume."

The marble fountains of Pamphili Doria, its lofty trees, its waterfalls, its terraces, its shrubs and flowers and wooded winding-paths, delight the soul of man, and clearly prove what magic scenes can be produced, when studied art goes hand in hand with nature. The walk, canopied by evergreens of ancient growth, and at the end of which a distant view of St. Peter's colossal temple bursts upon the sight, has so much truth and judgment in its plan, that I question whether its parallel can be found in the annals of horticultural design.

When St. Peter's dome is illuminated, whilst standing under the wooded archway of this walk, you may fancy yourself on the confines of Elysium.

As an additional charm to the beauties of Pamphili Doria, the birds are here protected, so that not one of them which comes within its precincts is ever transported to the bird-market at the Pantheon in Rome, where individuals of every species known in Italy, from the wren to the raven, may be had, ready trussed for the spit. I myself, in the course of the season, have seen and examined the following list of good things on the stalls, to regale natives and foreigners in Rome.[*] Towards the close of April, the walks of Pamphili Doria resound with the sweet notes of the nightingale both day and night; and, from February to mid-July, the thrush and blackbird pour forth incessant strains of melody.

There stands in this enclosure a magnificent grove of stone pines, vast in their dimensions, and towering in their height. Here the harmless jackdaw nestles, here the hooded crow is seen, here the starling breeds in numbers, and here the roller, decked in all the brilliant plumage of the tropics, comes to seek his daily fare. But, as far as I could perceive, after two seasons of observation, he does not make his nest in the trees. Holes in lofty walls, and in stately ruins, are the favourite places for his nidification. The cradle plumage of his young displays the metallic colours of after-life; hence, there is no perceptible difference in the appearance of the adult male and female. After passing the summer months in Europe, he returns to Africa at the autumnal equinox.

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[*] Wild boars, roebucks, red deer, hares, rabbits, pheasants, frogs, common partridges and two other species, quails, water rails, godwits, snipes, woodcocks, dabchicks, coots, wild ducks, wild geese, golden plovers, green plovers, sandpipers, wigeons, teal, gargany, brown-headed ducks, sheldrakes, tufted Grecian ducks, green linnets, goldfinches, brown linnets, grosbeaks, land tortoises, ringdoves, rock pigeons, fancy pigeons, wagtails, robin redbreasts, common buntings, grey buntings, cirl buntings, bluecap titmouse, oxeye titmouse, long-tailed titmouse, blackcap titmouse, cole titmouse, blackcap sylvia, song thrush, blackbird, blue thrush, jays, magpies, rooks, hooded crows, hedge sparrows, hawks, siskins, common larks, black-throated larks, titlarks, smaller larks, judcocks, land rails, combs from the heads of cocks, fowl and turkey legs and feet, buzzards, curlews, small stints, redwings, pochards, falcons, civetta owls, whinchats, windhover hawks, kites, stone curlews, jackdaws, shoveler ducks, gobbo ducks, hedgehogs, water hens, spotted water hens, bitterns, mergansers, stormcocks, porcupines, foxes, goats, kids, yellow wagtails, fieldfares, hooting owls, horned owls, barn owls, wheatears, redstarts three species, nightingales, yellow-breasted chats, stonechats, brown-headed shrikes, common shrikes, little terns, gulls, Guinea fowls, goatsuckers, eggs from the ovarium of all sizes, wind eggs, larger white egret, common heron, turkeys, guts of turkeys and common fowls, swifts, swallows, starlings, little bitterns, white-winged bitterns, large bitterns, bullfinches, chaffinches, water tortoises, turtle doves, water rails, shags, red-throated mergansers, badgers, lesser spotted woodpeckers, smallest woodpeckers, green woodpeckers, small white-throated mergansers, common wrens, common gold-crested wrens, splendid golden-crested wrens, house sparrows, mountain sparrows, mountain sparrows with yellow speck on the throat, olive-throated bunting, crested grebes, Canary birds, hoopoes, rollers, bee-eaters, golden orioles. Add to this list butcher's meat of all descriptions, and the finest fruits and vegetables, and flowers. By the custom-house report, seventeen thousand quails have entered Rome in one day.

N.B. If a man cannot get fat in this city at a very moderate expense, it must be his own fault.

The aerial movements of this bird put one in mind of our own rook, when in the act of shooting downwards from on high. He rises perpendicularly, and then descends in rapid zigzag evolutions, during which process, if you get betwixt the sun and him, you have a magnificent view of his lovely plumage. His voice has something in it of the united notes of the jay and magpie.

Innovations in modern ornithology, so prolific of scientific confusion and unimportant distinctions, have removed this bird from the family of Pie, where it had had a place from time immemorial; thus rendering useless its most ancient name of Pica marina.

It was known in the time of the Romans. "Picus in auspiciis avis observata Latinis;" and it was also admitted into heathen mythology. Virgil alludes to the beautiful colours in its wing: and above two thousand years ago, when the gods used to change men into other animals, just as easily as we nowadays change our acts of parliament, the Pica marina was both king and horsebreaker, "equum domitor." He was married to the celebrated Circe, an enchantress of the first order; she who changed the sailors of Ulysses into swine. The royal horsebreaker had unfortunately shown a partiality for a young woman in his own neighbourhood, a thing not altogether unknown in our days. This so enraged his wife, that, with her magic rod, far more potent than finger nails, she transformed him into a bird; and, at the same time, bespangled his wings with beautiful colours.

> "Fecit avem Circe, sparsitque coloribus alas."

Walton Hall, Nov. 9. 1842.

Art. III. *Bicton Gardens, their Culture and Management. In a Series of Letters to the Conductor.* By James Barnes, Gardener to the Right Honourable Lady Rolle.

(*Continued from our preceding Volume,* p. 621.)

Letter IV. *House for New Holland Plants. List of New Holland Plants.*

I will now give you the dimensions, and a few other particulars, of the most lovely and interesting tribe of plants ever introduced into this country, in my humble opinion, and which generally come into flower at a very convenient season of the year; but, indeed, there is always something new and interesting amongst such a noble collection of plants as there is in the New Holland House at Bicton gardens. If charcoal and charcoal dust have made more improvement in one tribe of plants than another, it is amongst them. They have all of them charcoal about them; and it is a pleasure, when potting them, to see the fine roots they make amongst it. This house has a noble span roof, and of the same dimensions, and fitted up in the same manner, as the heath-house, with a Portland stone walk between the stone platform in the centre and the shelves, which go all round. As you took particular notice of my system of potting and training these plants, I will leave you to give a description of them. There is one most remarkable plant, Chorózema vàrium, amongst many others which I forgot to show you; it is out of doors, and too large to be got into any house this season, therefore I intend leaving it out of doors for the present, and sheltering it a little, to try if it will do out. It will astonish every one but those that have seen it, when they are told that this time two years it was a plant in a 32-pot, what is called in Devonshire a penny pot; it is now in a 4-shilling pot. It is only 3 ft. 6 in. high, and is 32 ft. in circumference, with many thousands of shoots, all set with flowers from top to bottom; the shoots are so thick that you cannot see whether the plant is in a pot or turned out into the ground, for the branches cover the grass turf all round, like a large rhodòdendron. But it will be asked what made it grow so wonderfully. Why, charcoal, loam, a little heath mould, some large stones, and a small quantity of river sand; and, by continually stopping the shoots, I made it so thick and dwarfish. I will give you another instance of the extraordinary effect charcoal has produced on another very valuable plant, Lechenaúltia bíloba, which has been said by many cultivators of plants to be a bad ugly grower. Now this plant, which I am going to describe, is about two years old, from a cutting; it is now in a No. 2. pot, is 1 ft. 3 in. high, covering the rim of the pot, and 7 ft. 9 in. in circumference, thick with shoots, as I have seen fine plants of L. formòsa at the exhibitions about London. I have counted 500 blooms open on the plant all at one time. If there is one plant in the house more beautiful than another, it is this plant. If 100*l.* were offered for a fellow plant to it, it could not be got. The gentleman that was with you asked what caused this plant to make such extraordinary progress. Why, charcoal. It has nothing but charcoal, stones, a little sand, and some heath mould, all jumbled together in lumps as large as bricks broken into about six or eight pieces. There is also Pimelèa decussàta, which I have treated in the same manner, 3 ft. high and 13 ft. 3 in. in circumference. I fancy those who exhibit in London would require a number of vans to remove sixty such specimens as this is. I will now give you a list of a few of the plants contained in the house, you being now aware of my treatment and method of training them, and having so lately seen in what health they are.

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
*Pol*ýgala oppositifòlia - -	40	7		6
cordifòlia - -	4	0		6
Pultenæ'*a* subumbellàta - -	1	6	8	6
villòsa - fine				
*d*aphnöìdes do.				
strícta - do.				
Murált*ia* míxta large				
Corræ'*a* longiflòra -	2	0	5	0
quadrifórmis -	2	6	3	6
pulchélla - -	3	0	4	6
speciòsa - -	2	0	3	6
Oxylòbium arboréscens - fine				
retùsum - do.				
Pultenè*æ* - do.				
capitàtum - do.				
Dillwýn*ia* rùdis fine				
spléndens - do.				
clavàta - do.				
floribúnda - -	1	3	4	0
cineráscens - -	1	6	4	9
speciòsa - do.				
púngens - do.				
Boròn*ia* denticul. do.				
crenulàta - do.				
serrulàta - do.				
triphýlla - do.				
vimínea - -	1	0	3	3
*a*nemonæfòlia -	2	6	3	6
Cròw*ea* *s*alígna fine				
Eriostèmon *b*uxifòlius - - fine				
cuspidàtus - do.				
Diplolæ'na Dampièri	2	0	5	6
Chorózema cordàtum - fine				
Dicksòn*ii* - do.				
mucronàtum do.				
vàrium - do.				
ovàtum - do.				
*s*partiöìdes - do.				
angustifòlium do.				
Henchmánn*i* -	1	6	6	3
Burtòn*ia* violàcea, fine specimen.				
conférta, do.				

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
Scótt*ia* dentàta fine				
Podolòbium chorozemæfòlium fine				
staurophýllum do.				
triangulàre - do.				
Mirbèl*ia* dilatàta -	1	0	4	0
reticulàta - -	1	3	5	0
ilicifòlia - fine	2	3	6	4
speciòsa - -	1	6	5	4
Sólly*a* heterophýlla very large.				
Mariánthus cæruleo-punctatus covers a wire trellis 4 ft. high and 2 ft. 6 in. wide, flowering from top to the bottom, all in one mass.				
Gompholòbium tenéllum - fine				
versícolor - do.				
pulchéllum - do.				
polymórphum do.				
tenuifòlium - do.				
grandiflòrum do.				
Hòv*ea* críspa - do.				
villòsa - do.				
tomentòsa - do.				
álba - - do.				
púngens - do.				
Manglès*ii* - do.				
lanceolàta - do.				
pannòsa - do.				
ilicifòlia - do.				
*A*càcia Brówn*ii* do.				
microphýlla do.				
prostràta - do.				
nígricans - do.				
pubéscens - do.				
dolabrifórmis -	9	6	7	6
and many others.				
Bossiæ'*a* rúfa - fine				
ensàta - do.				
Templetòn*ia* retùsa fine.				
*G*enísta rhodólphia fine.				
*C*ýtisus élegans fine				

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
*C*yt. racemòsa fine				
Hardenbérg*ia* Comptoni*àna* - -	2	0	4	6
monophýlla longiracemòsa - fine				
Poinci*àna* Gillièsii do.				
Tropæ̀olum tricolòrum - fine				
brachýceras do.				
grandiflòrum do.				
Jarráttii - do.				
Chymocárpus pentaphýllus - fine				
Helichrýsum retórtum - fine				
fasciculàtum do.				
spectábile - do.				
Leucostémma vestìtum - fine				
Aphélexis hùmilis do.				
Lechenaúlt*ia* formòs.	1	0	6	0
Drummóndii -	1	0	4	0
Brachysèma latifòlium - fine				
Plagiólobum chorozemæfòlium - do.				
Platylòbium formòsum - fine				
Murray*ànum* do.				
triangulàre - do.				
Kennèdy*a* nígricans	4	0	4	6
Maryátt*æ* - -	5	0	4	6
pannòsa - -	2	0	5	0
Zíchy*a* inophýlla -	2	0	10	6
glabràta - fine				
trícolor - do.				
Pimelèa *r*òsea do.				
intermèdia - do.				
híspida - do.				
sylvéstris - do.				
*l*inifòlia - do.				
*h*ypericifòlia do.				
*l*igústrina - do.				
incàna - -	1	0	4	6
híspida *r*òsea -	0	8	4	6
Dracophýllum secúndum - fine				
Cosmèlia rùbra do.				
Stenanthèra *p*inifòlia fine.				
Gardoquí*a* Hookèrii fine.				
Grevílle*a* spléndens -	2	6	7	4
argentifòlia - -	2	6	6	6
sulphùrea - fine				
E′pacris paludòsa do.				
campanulàta do.				
*o*nosmæflòra do.				
impréssa - do.				
pulchélla - do.				
nivàlis *r*òsea do.				
grandiflòra - do.				
purpuráscens do.				
obtusifòlia - do.				
purpurascens rùbra - fine				
ceriflòra - do.				
lævigàta - do.				
variábilis - do.				
Fabiàn*a* imbricàta fine.				
Labíche*a* bipinnàta -	1	6	4	0
Prostanthèra violàcea - fine				
Bánks*ia* coccínea do.				
serràta - do.				
*q*uercifòlia - do.				
speciòsa - do.				
Cunninghàmii do.				
dentàta - do.				
littoràlis - do.				
æ′mula - do.				
formòsa - do.				
prostràta - do.				
Dryándr*a* nívea do.				
armàta - do.				
plumòsa - do.				
*p*terifòlia - do.				
nervòsa - do.				
floribúnda - do.				

The above are only a few out of the collection of plants in the New Holland House at Bicton.

Bicton Gardens, Sept. 28. 1842.

LETTER V. *The Orange and Camellia House, Vineries, Pineries, and Peach-houses, Back Sheds, &c. List of Camellias.*

I AM now about to describe the Orange and Camellia House; but, as you took particular notice respecting their growth, health, bloom, bud, &c., and my method of training them into any shape I chose, &c., I need not make many remarks on the plants. [Tied into regular conical shapes with green packthread. Mr. Barnes will, we trust, give us the details in a future letter.] I will describe to you my own method of potting or tubbing them, as the greater part of them are in tubs. Orange trees and camellias are both of them rather a difficult tribe of plants to get into a vigorous state after once losing their roots, and after the soil has been allowed to get into a sodden sour condition. I consider the orange trees to look worse than any tribe of plants I have under my charge at this present time. As you requested, I will give you the dimensions of this noble house; and then describe the state in which I found the plants. It is span-roofed, 120 ft. long, 16 ft. high, and about the same width.

I found a beautiful lot of young Orange Trees when I first came two years ago; but by some means, at some time or other, they had been so dreadfully treated for the want of water, that they had actually lost every root, and were as black as the ink with which I am now writing. I was actually obliged to get a large hammer and an iron rod, and drive it through the earth in the tubs to let the water pass. They had been planted in a very heavy red marl, not loam, and had been soured with water; then, by getting dry, the earth closed together as hard as a lime-ash floor (as it is called in Devonshire), and shrunk away from the sides of the tub, so that a mouse could run round between the roots and the tub. You may imagine this was a curious way to see the roots of orange trees in, but so it was. I set to work and filled up this space as soon as I could; for what water had been given to them had run down this cavity, and out at the bottom of the tub as fast as it was poured in. I could do nothing more to them until the spring; when I took them out of the tubs they were in and put them into smaller ones, and the tubs at this time contain one mass of beautiful fibres. I have been all this summer preparing some beautiful loam for the purpose of shifting them early next spring (if I should live) into large tubs, and I intend to char a good heap or two of rubbish to mix with it, and plenty of stones.

I must here observe before going further, that I purposely keep their heads from growing this season to any extent, because they should make themselves properly strong at the bottom first of all; for it is of no use building a house without first laying the foundation: therefore, it would not be wise of me to force a fine head upon those poor trees for show, if they were so weak on their feet and toes as not to be able to carry their fine heads after getting them. Yet I could turn them out into a draught, in a cold windy place, and allow it to cut their fine heads all to pieces, and then say it was not my fault, for I could not help the wind; but I should have too much regard for the poor plants to punish them that way.

Now, as you particularly wished me to give you a little idea of my System of potting Camellias, I will do so: it will no doubt be thought a rough method by some. Do you imagine that they have the mould sifted, and all the stones picked out of the soil in their native country? I always fancied they had not, and for this reason, I never saw any man in the woods or hedge-rows in this country sifting the soil for our native trees to grow in; nor do I believe those noble trees in Bicton Park (of which I have promised you a description some day) would ever have attained the wonderful size they have done, if men had been employed all their lives sifting the soil about them and picking out the stones. I get loam and heath soil in equal quantities, stones, and river sand, one barrow of rotten dung to eight of the above mixture, well mixed up together as roughly as possible.

Now, as I wish to be better understood than a certain author was when he recommended nitrate of soda as a manure for the *Pinus*, and was told afterwards, by those who had tried it, that they had killed all their plants, although they had done exactly as the author alluded to had prescribed, I shall try to explain my system clearly; but I do not ask any body else to follow it. In the first place all the soil should be sweet; the dung must be rotten and sweet (some persons would call dung rotten that came from a pigsty; I do not). No one should attempt this kind of work, who did not know something about it. The right season for potting camellias is when they require it; not because you observed your neighbour doing so yesterday, nor because you read in some man's noted calendar last evening when to pot those plants. You must judge by the constitution of what is under your care; and, till you know something about it, you will be apt to burn your fingers. Now, I give my camellias a good soaking of manured water, two or three times in the season, which would frighten many growers of them; therefore I only recommend it to those who understand both the properties of the soil they have already used, and of the liquid they intend using, or it will affect the plants in the same way as a pot of porter would a weak sickly person, if taken of a morning before breakfast.

I will now give you, as you wished, the names, &c., of some of the plants in this house.

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
Camélli*a* japónica. double white, several large ones, some being -	6	6	18	0
Chándler*i* - -	5	0	11	0
*r*òsea - - -	6	0	9	6
Warátah - -	6	6	18	6
Beál*ii* - -	8	0	10	6
eclípsis - -	6	0	9	0
exímia - -	9	0	12	6
Donckelàer*i* fine				
Cardinal - do.				
péndula - do.				
Vandès*ia* supérba fine.				
Scho*tiàna* - do.				
*m*yrtifòlia - do.				
Fórd*ii* - do.				
*a*nemoniflòra álba fine.				
elàta - do.				
Ròsa sinénsis do.				
celestìna - do.				
Sweet*iàna* - fine large plants.				
nobilíssima fine				
spléndens - do.				
Dallas - do.				
Hume's blush large				
corállina - fine				
Gilliès*ii* - do.				
Gilliès*ii* striped do.				
Louis Philippe do.				
King - do.				
prínceps - do.				
picturàta - do.				
coronàta - do.				
Hendersòn*ii* do.				
triúmphans do.				
Wiltòn*iæ* - do.				
Perfection - do.				
élegans - do.				
punctàta - do.				
expánsa - do.				
Blackburn*iàna* do.				
Spofforth*iàna* do.				
Campbéll*ii* - do.				
Welbánk*ii* - do.				
epsoménsis do.				
Róss*ii* - large				
Sabin*iàna* - do.				

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
C. j. pulchérrima do.				
trícolor - do.				
candidíssima do.				
Pompònia - do.				
Colvíll*ii* - do.				
delicatíssima do.				
Pálmer*i* - do.				
Palmer's white do.				
likewise several others.				
*C*áctus speciosíssima with Epiphýllum worked on it -	10	0	12	6
quadrangulàris -	5	5	11	6
Jenkinsòn*ii* - -	6	6	12	0
hýbrida - -	6	0	12	6
Ackermánn*ii* fine				
truncàta - do.				
Witsèn*ia* corymbòsa fine.				
*R*hododéndron arbòreum - -	4	6	9	6
altacleréns e -	7	6		
*c*innamòmeum				
Victoria, several	5	0		
barbàtum - fine				
campanulàtum do.				
Azàlea índica álba -	3	0	13	6
phœnícea grandiflòra - large				
índica flòre plèno álbo, a very fine specimen, and a very rare one.				
Daniels*iàna*, fine, and several others.				
Agapètes setígera, very rare and valuable plants	4	6	9	8
glàbra, very rare -	4	0	5	0
Enkiánthus reticulàta - -	4	0	9	6
quinqueflòra, both of these rare -	6	0	8	4
Canavàlia bonariénsis covering a large space of trellis-work.				
Likewise numerous other valuable plants.				

The Back Sheds. — As you expressed a wish to have some particulars respecting the sheds, store-rooms, &c., here, and I have at present half an hour to spare, I will just give you a few lines on the subject, as far as we have gone. There is a shed the whole length of the back of the palm-house, where you observed a store of large flower-pots, and green string stretched out going through the process of painting, &c. At the back of the heath-house there is a mushroom bed; likewise at the back of the New Holland house. I told you that I would some day tell you of a sure and easy method of growing mushrooms; but I must delay it until I have made a little more progress with the houses. You likewise saw a store-room, where baskets, hampers, flower-pots, wire, trellis, new tools of different kinds not yet in use, and many other little things are kept. You next saw another little store-room, where I keep charcoal dust, bone dust, and soot. You next saw another long open shed at the back of the two vineries, with a loft over to keep flower-pots in; the bottom part filled with old sugar hogsheads, packing tubs, and cement casks, with stores of loam of different sorts, heath-mould, rotten dung, leaf-mould, cow-dung, sheep-dung, different kinds of sand, &c.; and at the open side you observed a quantity of rough shelves I had fixed for drying and sweetening different soils on in the winter; as it faces the north it answers two purposes, first by sweetening the soil, then by keeping the snow from blowing all over the shed.

Vineries are rather scarce in Bicton gardens. Considering what noble gardens they are, you would expect to see vineries from which grapes could be had every day in the year. If there is one plant in the world that I am more fond of than another, it is the beautiful vine, for the kinder you treat it, the more it will do for you. You saw the grapes and tasted them, therefore I leave you to say what you thought of them. I have a great deal to say some day on the culture of the vine, if it pleases God to spare me. I had once the care of a house of grapes for a large grape-grower in the neighbourhood of London, who had many other large houses equally good. I heard a man offer my master 175 guineas for the crop in this house, and would cut them himself within a given time; but my master wanted 200 guineas, took them to market himself, and made more than 240 guineas. Now the house they grew in was not worth more than 70*l.*

Pineries.—You saw and made some notes on the large pine-pit, nearly the length of the orange-house, likewise on the half-hardy pit the same length; you also seemed to observe the pines and pine plants. I hope you will not flatter anything under my charge, but point out all the faults you saw; for I am perfectly satisfied that nothing is perfect, and mean to persevere and endeavour to improve every thing under my care. If you say that you saw queen pines here weighing more than 2½ or 3 lb., people will not believe you, when they recollect the grand exhibition at Chiswick, where queen pines were shown of what was considered an enormous weight, 3 lb., and one fruit of that weight got stolen, and found its way to Bow Street.

The two peach-houses I leave you to describe, as you took some notes of them. I can only say the trees are too far from the glass to get early fruit. The tool-shed, I think, you also noted down; likewise the shed at the back of the stove, where you noticed tubs, boxes, &c., filled with pebbles of different sizes, broken stones, and broken potsherds of all sizes.

Bicton Gardens, Sept. 29. 1842.

Letter VI. *Chrysanthemums. Manured Water. Properties of Charcoal, &c.*

Since I have taken in all the plants to the various houses, I have arranged my Chrysanthemums. I believe you made some observations on them, and took notes, and asked me to describe my manner of treating them, which I will now do. In the first place, I make it a rule at this season of the year to take off two or more suckers of each variety; I pot them in small 60-sized pots, let them stand in these pots until the March following, when I remove them into 48-sized pots, to grow them in. I take the tops off in the beginning of May, and strike them; then in August lay a quantity from the plants that are turned out for the purpose, to pot (as now) in the beginning of October. This gives me four successions of plants; so that they are in flower from this time until February next. I have also winter-flowering pelargoniums, Prímula sinénsis, cinerarias, Guernsey lilies, and camellias, always ready at this time, as it makes the houses look cheerful all the winter. The collection of chrysanthemums at Bicton consists of about 100 varieties. I pot in the whole about 1000 plants or rather more. I grow them in charcoal and loam, occasionally giving them a little manured liquid. Do you remember my observation on manured liquid, when I espied a blunder that had been made on a row of the largest and most forward of my chrysanthemums, and which blunder, I was told on enquiry, had been committed by the boy, viz. "It is well to have a boy sometimes to throw the blame upon?" However, when manured water is properly understood it will be a great thing, not only for gardeners, but farmers, and indeed for all mankind, I hope.

I think you wrote something respecting the Properties of Charcoal eighteen or twenty months since, and I believe it was translated from the German. Now, you did not expect to meet with so humble an individual as myself, who had not only used it for years before, but even before he rightly understood the wonderful and astonishing properties of it. No doubt but many have tried it in various ways, for I have been closely observing the different questions asked in the *Gardener's Chronicle* at times during this last year. I think the first question which I saw answered by Dr. Lindley was to this effect: that it had no other good qualities but to serve as a substitute for other things to keep the soil porous. I have lately seen another answer: that the chemists have not yet come to a decision respecting the properties of charcoal. Now I am neither chemist nor scholar, but I think I can one day soon explain the different properties of charcoal and of manured water, and, I flatter myself, to the satisfaction and benefit of many; and I hope too to live to explain some more things which will not only be startling to many, but, I trust, a lasting benefit. But I must hasten to a conclusion, and caution any one from using these manures before he understands the properties of them. I give all my plants manured water at times. Did you smell any thing, in either house or pits, unpleasant? did you see anything unsightly or disagreeable? did you see one plant out of ten thousand unhealthy? did you see one plant that could not breathe, if they stood ever so thick? How is all this large collection kept free from disease and vermin? I will tell you some day, if it pleases God to spare my life. You know there are diseases of many kinds, and vermin of all sorts, to which every plant is subject in its natural state. You also hear of blights, and all kinds of cures are recommended for these things; but I think that the best cure is a preventive. I do not use blue vitriol in manured liquid to keep the smell away, nor any kind of poisonous drugs to kill vermin and cure diseases. We see the rain, the snow, and the hail descend, but it is all pure: we hear the wind blow, and it is healthy: why should we act in opposition to nature? I hope to live to see things and persons better understood; not so much deception and jealousy, but more brotherly love, and readiness to assist one another.

Bicton Gardens, Oct. 1. 1842.

LETTER VII. *The Conservatories, and List of Plants in them. The Orchideous Houses and Stoves. Lists of Orchideæ and of other Stove Plants.*

I SHALL this evening give you a short description, according to your wish, of the two Conservatories, one on each side of the temple which you so much admired, as you did also the beautiful fountain of water, and an obelisk at a short distance, both in a line with the centre of the temple. The obelisk was built by Henry, first Lord Rolle, in the year 1743, and serves as a landmark for vessels at sea. You desired me to give you some particulars of a very large Escallòn*ia* montevidénsis that is now in full bloom with its beautiful racemes of flowers, the circumference of which is 34 ft., and the height 6 ft., with 1520 heads of flowers now expanded. However, I shall treat on all these noble specimens when I come to them.

When you were here, the two above-mentioned conservatories were filled with pelargoniums, fuchsias, balsams, globe amaranthus, Prímula sinénsis, Achimènes coccínea, and cockscombs of fourteen different varieties. All these plants are grown with charcoal mixed in the earth, or are drained with it, and every plant is fond of it. The houses are each of them about 40 ft. long, 18 ft. high, and 18 ft. wide. They are both of them now furnished with a row of large orange trees, banksias, many varieties of acacias, including large plants of *A.* alàta, armàta, Brówn*ii*, longifòlia, pulchélla màjor, lophántha, díscolor, *m*yrtifòlia, affìnis, &c. Likewise large plants of

*F*ìcus rubiginòsa
Datùra (Brugmáns*ia*) bícolor cándida
Hàke*a* heterophýlla
*M*yrìca *q*uercifòlia
Dodon*æ'a* pinnàta viscòsa
Hibbért*ia* volùbilis
*H*ibíscus spiràlis
Sparrmánn*ia* africàna
Eugèn*ia* *l*igústrina
Leonòtis Leonùrus
Eùriops pectinàtus
O'lea europæa
Pròte*a* villòsa
*N*èrium spléndens
*C*lèthra arbòrea
Ruéll*ia* Sabin*iàna*
Pachysándra procúmbens
Swammerdàm*ia* antennàna, very rare
Ozothámnus myrsöìdes
Callistèmon semperflòrens lanceolàtus
*C*acàlia rèpens
Eutáxia *t*axifòlia *m*yrtifòlia
Limònia *c*itrifòlia
Cày*a* angustifòlia
Goodèn*ia* ovàta, fine

Name.	Circumf.		Height.	
	Ft.	In.	Ft.	In.
Virgíl*ia* capénsis -	12	6		
*E*rìca gélida - -	4	6	8	4
multiflòra -	2	6	8	6
Indigófera purpuráscens - -	8	0	11	0
*La*úrus *Cámphora* -	14	0	20	8

A large plant of *A*'loe arboréscens. A pair of large American aloes in each house, and many others. Likewise many old and valuable Cape plants, and many that have been raised from foreign seeds; a large collection of fuchsias, cinerarias, and other plants too numerous to dwell upon at this moment.

I will now give you some account of the Orchideous and Stove House, which is a fine large one, but crowded with plants to overflowing. The Portland stone platform up the centre is so crowded and full, that there is hardly room for the plants to breathe. The Portland stone shelf all round the house is 2 ft. wide, and the plants are growing almost on the top of each other. The rafters are completely loaded with blocks and baskets of all sizes, covered with that beautiful and interesting tribe of plants, Orchidàceæ; but, in my simple judgement, it does not require a quarter of the care and attention to cultivate the orchideous plants that many persons use. I have not yet, it is true, had them all drained and potted with charcoal, but those I have done so by are in the most vigorous and healthy state, so that, as opportunities offer, I shall use charcoal with all of them, for I am convinced it has a very beneficial effect upon them; and you will remember I pointed out many plants to you here, that you might take the opportunity of observing them, and seeing the effect it had on them, which is truly astonishing. I will now give you a few of the names of the plants in this house:—

Vánda tères, fine large plant.
Roxbúrgh*ii*
multiflòra, fine, large.
Aérides affìne
tessellàtum
odoràtum
Phàius álbus
maculàtus } several very large plants.
Woodfórd*ii*
These three plants of Phàius grandiflòrus growing very strong in charcoal.
Læ̀l*ia* grandiflòra
ánceps
autumnàlis
Schombúrgk*ia* críspa
tibícina
Bifrenària aurantìaca
Pholidòta jamaicénsis
Cyrtochìlum maculàtum
Dendròbium cæruléscens
Calceolària
aggregàtum
pulchéllum
chrysánthum
grandiflòrum
nóbile
Jenkíns*ii*
monilifórme
speciòsum
secúndum
crumenàtum
macrostàchyum
cùpreum
Acropèra Loddigès*ii*
Trichopília tórtilis
Megaclínium falcàtum
Bolbophýllum barbígerum
recúrvum
Miltòn*ia* spectábilis
Stanhòpe*a* devoniénsis
tigrìna
ebúrnea
oculàta
insígnis
grandiflòra
Oncídium críspum
bifòlium
On. carthaginénse
Harrison*iànum*
Lance*ànum*
flexuòsum
lùridum
papílio
species, fine.
ornithorhýnchon
Cebollèt*i*
leucochìlum
divaricàtum
pùmilum
ampliàtum
pùbes
pulchéllum
Catasètum tridentàtum
maculàtum
Hoóker*i*
Grammatophýllum multiflòrum
Èria stellàta
Maxillària pícta
Barringtòn*iæ*
Harrisòn*iæ*
marginàta
dénsa
squàlens
Warre*àna*
Cattlèy*a* Forbès*ii*
Móss*iæ*
Harrisòn*iæ*
labiàta
intermèdia
Loddigès*ii*
Skínner*i*
críspa
Schombúrgk*ii*
Epidéndrum ciliàre
species
noctúrnum
pygmæ̀um
odoratíssimum
elongàtum
clavàtum
macrochìlum
Harrisòn*iæ*
aurantìacum
species
cochleàtum

All of the following are fine large plants: —

- Cypripèdium venústum
  - insígne
- Myánthus cérnuus
- Renanthèra coccínea
- Calánthe densiflòra
  - *v*eratrifòlia
- Goódyer*a* díscolor
- Saccolàbium guttàtum, very large.
- Pleurothállis Gròby*i*
  - saurocéphala
  - Lance*àna*
- Gongòr*a* maculàta
  - atropurpùrea
- Cyrtopòdium venústum
  - speciosíssimum
  - Andersòn*ii*
- Cymbídium sinénse
  - *a*loïfòlium
- Trigonídium obtùsum
- Coryánthes macrántha
- Cirrhæ̀a víridi-purpùrea
  - Loddigès*ii*
- Ornithídium coccíneum
- Œceóclades maculàta
- Rodriguè*zia* secúnda
  - planifòlia
  - and many others.
- Peristèria péndula
  - cérina
  - elàta
  - Bárker*i*
- Bráss*ia* Lance*àna*
  - maculàta
  - macrostàchya
  - caudàta
- Sarcánthus rostràtus
  - teretifòlius
- Zygopétalum Mackà*ii*
  - stenochìlum
  - rostràtum
- Monachánthus díscolor
- Eulòphia macrostàchya
  - guineénsis
- Neóttia pícta
  - elàta.

The whole of the following stove plants are growing in earth, with some charcoal mixed: —

- Gloriòsa supérba
- Poinsétt*ia* pulchérrima
- Catesbæ̀*a* spinòsa
- *Z*íngiber officinàle
- Russèl*ia* *j*úncea
- *C*ròton variegàta
- Æschynánthus grandiflòrus
  - parasíticus
  - species.

    The two latter are now bearing long pods of seeds, from 12 in. to 16 in. long. I have never before heard of their doing so in England.
- Ixòr*a* grandiflòra
  - coccínea
  - flámmea
  - crocàta
  - obovàta
  - *r*òsea
  - *Bandhùca*
- Bauhín*ia* aculeàta
  - *? Mánghas*
  - parviflòra
- Quisquàlis índica
  - new species
- Ardísia pyramidàlis
  - lentiginòsa
  - críspa
  - littoràlis
  - hymenándra
- Ard. paniculàta
- Strelítz*ia* *j*úncea
  - regìnæ
- *C*óstus speciòsus
- Passiflòra Loúdon*i*, large plant.
  - quadrangulàris, very fine.
  - bícolor, do.
  - prínceps, do.
- Gloxín*ia* rùbra, large plant.
  - cauléscens, do.
  - hirsùta, do.
  - speciòsa, do.
    - álba, do.
  - Presslèy*ii*, do.
  - Yoúng*ii*, do.
- *C*rìnum cruéntum
  - pedunculàtum
  - amábile

  all three very large plants.
- Billbérg*ia* zebrìna
  - viridifòlia
  - fasciàta
  - amœ̀na
  - díscolor
- Stachytárpheta mutábilis
- Justíc*ia* calycótricha
  - peruviàna
  - coccínea
  - flavícoma
  - nodòsa
- *M*ýrtus tomentòsa

*V*ínca álba
*r*òsea
*H*ibíscus *r*òseus
flàvo-plènus
collìnus
rùbus
Hòy*a* carnòsa
*E*uphórb*ia* spléndens
fúlgens
Breyòn*ii*
Brunsfél*sia* americàna
latifòlia
angustifòlia
*P*ancràtium fràgrans
rotàtum
Játropha pandurifòlia, very large.
Clerodéndron fràgrans
speciòsum
Apheländra cristàta
Rondelèt*ia* speciòsa, very large.
Lantàna scábrida
Xylophýlla falcàta
spinòsa
latifòlia
*L*aúrus nítida
*P*lumbàgo *r*òsea
capénsis
Abùtilon aúreum
Hamél*lia* Ackermánn*ii*
Calpicárpum Roxbúrgh*ii*
Hedýchium spicàtum
Gardner*iànum*
coronàrium
racemòsum
*A*sclèpia*s* curassávica
Coutarèa speciòsa
Blàke*a* trinérvia
Brówn*ea* grándiceps, very fine.
A\`rum odòrum
vivíparum
Alpíni*a* nùtans
Francís*cea* Hòpe*a*
uniflòra
Galphími*a* spléndens
Eránthemum bícolor
pulchéllum
Pavétta cáffra, very large
Rivìn*a* hùmilis
Stephanánthus hastàta

*C*án. índica
angustifòlia
lùtea
coccínea
Ipómœ\`a insígnis
Sellòw*ii*
Horsfáll*ii*
Barlèr*ia* mìtis
Helicònia Harrisòn*ii*
Thunbérg*ia* fràgrans
lùtea, fine, new
alàta
álba
aurantìaca
*G*ossýpium arbòreum
Anacárdium occidentàle
*P*sídium polycárpum
Dichorizándra thyrsiflòra
*C*ombrètum purpùreum
grandiflòrum
Chloróphytum *o*rchidiástrum
Hymenocállis speciòsa
*P*íper ovàtum
incànum
umbellàtum
Ruéll*ia* formòsa
Gésner*a* zebrìna, large plants.
bulbòsa
spléndens
Coóperi
Petrèa Staplès*iæ*
Gardèn*ia* flórida
radìcans
amœ\`na
*P*hrýnium zebrìnum
Portlánd*ia* grandiflòra
*E*chìtes suberécta
Quisquàlis índica, new species.
Maránt*a* bícolor
*N*epénthes distillatòria, 12 ft. high.
Sinníng*ia* villòsa
Schótt*ii*
maculàta
Brandès*ia* pórrigens
Dracæ\`n*a* terminàlis, 10 ft. high.
Dràco, 8 ft. high.
Stephanòtus floribùndus covers a very large space of trelliswork.

I believe I have now given you a rough description of the twelve houses which you saw. The thirteenth, which is a very interesting one, we, by some means or other, passed by in our hurry, being briskly engaged in talking and looking at other things. It is the propagating house, which is a small but very pretty one, adjoining the potting-shed ground. The seeds and cuttings are sown here; and grafting and inarching are first begun in the potting-shed, and the plants are afterwards nursed in the propagating house. I sow and strike, in a great measure, every thing of consequence with some charcoal amongst the earth; some plants are struck wholly in charcoal, and I sow seeds in the same way.

Bicton Gardens, Oct. 8. 1842.

Art. IV. *Report on rare or select Articles in certain British Nurseries and private Gardens.* Drawn up from personal inspection, or from communications received. By the Conductor.

Being desirous of producing an Annual Report on the accessions of trees and shrubs made to the British arboretum, we advertised on the wrapper of the *Gardener's Magazine,* and in the *Gardening Newspapers,* in November last, inviting nurserymen, curators of botanic gardens, and gardeners having the care of private collections, to send us notices of what they had new, rare, or remarkable. We received a number of letters, which, with notes taken by ourselves in Somersetshire, Devonshire, Hertfordshire, &c., we have incorporated into the present paper. Our readers will find some things new, or that appear to be so, and a number of articles of comparative rarity, or otherwise of interest. To determine what is really new, we ought either to see plants during the summer, or receive specimens of them in autumn, which we trust we shall do next autumn; or, what would be best of all, every person thinking he has any new tree or shrub ought to send a plant to the Horticultural Society's Garden, where it will be compared with what is already there, and its merits reported on. In the meantime, the Report now submitted to our readers will, we trust, be of use both to collectors and nurserymen, and encourage both to be more copious in their communications in September next, for the Report which we intend to draw up for 1843.

There are those, and we are among the number, who dislike excessively the addition of trifling varieties to trees and shrubs, or other plants. Nurserymen are much too prone to introduce such varieties, and we object to them, not only on account of their insignificance, but also because they tend to draw the attention away from new species. How easy would it be to introduce hundreds of varieties of the common oak, Turkey oak, holm oak, or common thorn! At the same time we acknowledge that almost all the most valuable culinary and agricultural plants, and most of the finest flowers, are varieties of the species to which they belong; and that truly distinct varieties are just as desirable as, or even more so than, new species. Hence the great number of names which we have admitted in this Report of which we know nothing.

CORNWALL.

Malvàceæ. — ***Plagiánthus Lampènii B. Booth.*** Botanical Reg. for 1838. No. 2032.; Arb. Brit. vol. i. p. 363. fig. 89. (here repeated); and Gard. Mag. for 1839, p. 275.

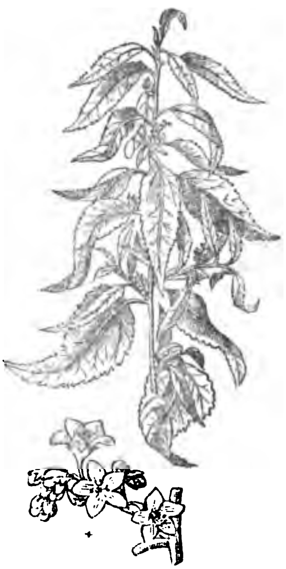

Fig. 1. *Sida pulchélla* Bonpl.

Carclew, the Seat of Sir Charles Lemon, Bart. — With the permission of Sir Charles Lemon, Bart., I forward to you the accompanying specimens of Plagiánthus Lampènii, an interesting shrub from Van Diemen's Land, which, in my opinion, deserves to be better known. It was described some years ago in the *Botanical Register*, from specimens communicated to me by the Rev. Robert Lampen, vicar of Probus, near Truro, and is noticed in the *Gardener's Magazine*, vol. xiv. p. 275. It was at first considered to be the same as *S*ìda pulchélla of Bonpland; but, although greatly resembling that plant, it is unquestionably very distinct, as may be seen by comparing the specimens now sent, with the figure of the *S*ìda pulchélla in Loddiges's *Botanical Cabinet*, t. 1841. [The figure above given, from the *Arboretum Britannicum*, is from a drawing by Mr. F. Rauch, from a specimen taken from a plant at Spring Grove; and it so closely resembles the specimens sent us by Mr. Booth, as to leave no doubt of the identity of the species.] You have not mentioned it in the abridged edition of your *Arboretum Britannicum*, on account, I suppose, of its being considered not sufficiently hardy for an English climate. In Cornwall, however, it thrives beautifully in the open border. There are plants of it here from 6 to 8 ft. high, nearly evergreen, and at this season covered with flowers, which renders it a desirable plant for the shrubbery, or for training against a conservative wall in those places which have not the advantages of a Cornish climate. — *W. B. Booth. Carclew, Dec.* 4. 1842.

DEVONSHIRE.

Exeter Nursery; Lucombe, Pince, and Co. — We looked into this nursery twice in the course of September, 1842, and were much delighted with it. The entrance is commanding from the disposition and substantial appearance of the buildings, the gates, and the plant-houses, as seen from the road. We shall first notice the plant-houses, next the collection of specimens of rare hardy trees and shrubs, and the arboretum, and lastly the general nursery stock.

The Camellia-house we have noticed in our Volume for 1842, p. 652., as the finest thing of the kind we have ever seen. Though it has only been planted four years, many of the camellias are now from 12 ft. to 16 ft. high.

The Stove, which is a span-roofed house, contains many rare and valuable plants, among which we observed *N*epénthes distillatòria running at least 30 ft. along the rafters, with pitchers of extraordinary size; and Cephalòtus follicùlaris, a very rare plant, in vigorous health.

The Orchidaceous House contains an ample collection, including fine specimens of vandas, cattleyas, saccolabiums, aerides, dendrobiums, peristerias, &c. One fine plant of Peristèria elàta, in flower, has twelve spikes 6 ft. high; and a specimen of Zygopétalon Mackài, coming into bloom, has thirty spikes.

The Heath-house is a spacious span-roofed structure, and it contains large specimens of all the rare kinds, Messrs. Lucombe and Co. having long been celebrated at the London Horticultural Society's shows for the beauty of their specimens.

There are two houses appropriated to New Holland plants, one for geraniums, and several others, besides numerous pits and frames. All the houses, as far as we recollect, are span-roofed, which gives more light, and is particularly well adapted for growing small plants which require to be near the glass; but they do not all stand north and south. They are all most substantially executed, and the health and vigour of the plants speak volumes both for their design and management.

The Specimens of rare Hardy Trees and Shrubs are chiefly contained in an enclosure at the end of the Camellia Temple, as it may well be called. It is surrounded by a hedge of laurel 10 or 12 feet high, within which is a parallel line of posts of the same height, formed of larch trees with the bark on, and connected by festoons of chains, for climbers. The interior of the area is planted with rare specimens, access to which is had by small winding gravel walks, communicating with broader walks; the whole forming an exceedingly interesting assemblage. Among the plants we noticed are, Araucària imbricàta, planted in 1832, 15 ft. high, in vigorous health; Cèdrus *Deodàra* 11 ft. high; Pìnus austràlis 12 ft.; Pìnus insígnis 14 ft. 6 in. high, with branches covering a space 14 ft. in diameter, transplanted two years ago without receiving any check; A'bies Douglàsii 18 ft. 6 in. high, producing cones; Juníperus excélsa 9 ft. 6.i n. high; J. recúrva 9 ft. high; J. sinénsis 11 ft. high; Cupréssus thurífera 7 ft. 6 in. high, quite hardy; Cunninghàmia lanceolàta 10 ft. high; Quércus I'lex Fórdii 18 ft. high: this is a distinct and very beautiful variety which assumes a conical shape, and is a free grower; it will form a fit associate for cypresses, Irish yews, and other cypress-like or churchyard evergreens. Besides these the following plants are fine specimens:— Collètia spinòsa, Vibúrnum japónicum, Dáphne índica rùbra, O'lea excélsa, *Bérberis* Coriària, B. rotundifòlia, and B. Wallichiànum, Arctostáphylos nítida; Mimòsa prostràta, quite hardy; Rhododéndron nóbile 8 ft. high, R. barbàtum (*Arb. Brit.* vol. ii. p. 1148., half-hardy), R. arbòreum, R. a. ròseum, R. a. álbum, R. zeylánicum (*Arb. Brit.* vol. ii. p. 1148.), R. campanulàtum, R. cinnamòmeum, and various other rare species and hybrids, mostly, however, only half-hardy; Andrómeda Drummóndi, Elæágnus sp., Quércus sideróxyla (*Encyc. of Trees and Shrubs*, p. 900. fig. 1674.), &c.

The Arboretum is being planted along both sides of a walk 1400 ft. in length; but, as night came upon us before we could get half through it, we must pass it over, not doubting that it will be rendered as complete as that of any nursery in the kingdom, and particularly so in the Abiétinæ and Cupréssinæ, of which Messrs. Lucombe and Pince have a collection as complete, we should think, as exists. (See the notice of their *Catalogue of Coniferæ* in our Volume for 1841, p. 86.)

The general Nursery Stock of Messrs. Lucombe and Pince afforded us, if possible, more satisfaction than the fine specimens. We do not know that we ever saw such immense numbers of rare species finely grown, the greater part of them in pots, in order to insure their growth, to whatever distance they may be sent: hundreds of araucarias, from 18 in. to 2 ft. high; the same of Pìnus insígnis, from 1 ft. to 6 ft. high; Deodar cedars by thousands, of various sizes; great numbers of Juníperus excélsa, J. recúrva, Cupréssus thurífera with its elegant tortuous branches, and many other species of junipers and cypresses, all in pots. Juníperus commùnis var. hibérnica, very distinct from the Swedish juniper, in quantities, from 2 ft. to 4 ft. high;

thousands of Irish yews (we wish we could see some in every churchyard in the country), from 5 ft. to 10 ft. high. There are two rows of selected plants of these, from 5 ft. to 6 ft. high, on each side of a walk which is 300 yds. in length, reminding one of the noble rows of this yew at Elvaston Castle; many thousands of Mahònia *A*quifòlium; many thousands of the new Lucombe oak, in pots, ready to be transmitted to every part of the world; an immense quantity of roses, rhododendrons, of ornamental trees generally, and of timber trees. Many of the ornamental trees are transplanted every second year till they attain the height of 10 or 12 feet, at which size they produce an immediate effect when planted out in pleasure-grounds. Among the *A*'cers in this nursery we saw what Mr. Pince assured us were plants raised from seeds received from North America as those of *A*'cer sacchárinum, but the plants were nothing more than those of *A*'cer *p*latanöìdes. We have found this to be the case in various other nurseries, which confirms us in a suspicion we have long entertained, viz., that *A*. platanöìdes and *A*. sacchárinum are one and the same species; notwithstanding the fact that the true *A*'cer sacchárinum has the leaves hoary beneath. We possess a plant of *A*. sacchárinum raised from American seeds, which answers Michaux's description, as does a stool in the Sawbridgeworth Nursery, and the specimen tree of this species in Lawson's Nursery, Edinburgh. There is not, or was not lately, any plant of this species in the Horticultural Society's Garden.

We had almost forgotten to notice the fruit trees in the Exeter Nursery, which are remarkably healthy, more particularly the trained peaches and nectarines, which are washed every spring with Mr. Glendinning's composition, given in *Gard. Mag.* 1841, p. 70.

The Mount Radford Nursery, Exeter; James Veitch and Son. Sept. 1842.— The nursery of Messrs. Veitch was, till lately, chiefly at Killerton, about seven miles from Exeter, but in 1834 it was removed hither. It now comprises in all forty acres of soil admirably adapted for the purpose, twenty-one acres of which are the freehold of Mr. Veitch, sen., and the remainder is held on long leases. The leasehold includes seven acres of Broadclist Heath, about seven miles from Exeter, which, being entirely a peat soil, is devoted to the raising and culture of American and other peat-earth plants. The grounds at Mount Radford are compact in outline, finely exposed, and judiciously laid out in squares and parallelograms, separated by many secondary and subordinate walks; the former graveled, edged with box, and accompanied with borders exhibiting specimen plants, ligneous in some places and herbaceous in others. The main or central walk is nearly 1000 ft. in length, and is planted on each side with a double row of choice specimens of trees and shrubs named. About half-way along the walk, there is a basin of water in the centre, surrounded by rockwork; farther on there are two basins of water, one on each side in a recess, also surrounded with rockwork; and two larger recesses of turf farther on, on which are planted a collection of pillar roses. This walk terminates at one end in the main entrance, and at the other in the private entrance to the house of Mr. Veitch, sen. The main cross walk is about 450 ft. in length, with a broad border of turf, on which there is a pinetum. This cross walk terminates at one end in an orangery, and at the other in a camellia-house; both very conspicuous objects from every part of the nursery, and from the public road; and both, in our opinion, altogether unsuitable for a nursery. Were they ours we should remove them without delay. The rest of the plant structures are most substantial, and indeed in every point of view unexceptionable; they include a stove, orchidaceous house, and various greenhouses and pits. There is a third walk, of about 800 ft. in length, with arched trellises at regular distances for climbing roses; and there are other walks bordered by standard roses. It would be of little use to go into further details without giving a plan, and, though we have one before us, there is not time at present to have it engraved. Taking it altogether, we think this nursery better laid out than any other which we have seen, and certainly in point of keeping it cannot be surpassed. We have not, however, seen the nurseries of Mr. Skirving of Liverpool, or Messrs. Dickson of Chester, for the last ten years; and they may probably be, as indeed we have heard that they are, laid out with as much care as the Mount Radford nursery. The latter has the great advantage of being all laid out at once, unfettered by existing objects, or by being leasehold. We have heard that this was also the case with the ground lately taken possession of by Messrs. Dickson of Chester.

The dwelling-house of Mr. Veitch, sen., is one of the most remarkable features in the Mount Radford Nursery, and, in our opinion, does Mr. Veitch very great credit. It is not every one who makes a fortune by business that possesses the much higher quality, after having made a fortune, of living like a gentleman. We could mention several nurserymen, now no more, who had made perhaps larger fortunes than Mr. Veitch, but who, after having done so, had not the art of elegantly enjoying them. Mr. Veitch's house is in the Elizabethan style, elegant in design externally, and replete with every comfort and luxury within that any reasonable man could desire. It is surrounded by a portion of lawn laid out somewhat in the Elizabethan manner, but in which that style is not so fully developed as it is in the house.

From Messrs. Veitch's nursery are known to have been figured a number of rare plants, including Echìtes spléndens, E. atropurpùrea, Rondelèt*ia* longiflòra, Lechenaúlt*ia* bíloba, Gésner*a* zebrìna, Manétt*ia* bícolor, Begòn*ia* coccínea, and, in the very last published periodicals, Tropæ'olum azùreum, the beautiful blue nasturtium, so long a desideratum. They have a collector in South America, who has lately sent them some bushels of seeds of Araucària imbricàta, from which they have already raised thousands of plants, so that this fine tree will soon be as common as the cedar of Lebanon. As Messrs. Veitch and Son have at present the care of the arboretum at Bicton, and are rendering it as complete as possible, by collecting hardy trees and shrubs from every part of England and from the Continent, they will be able to form a very complete arboretum in their own nursery; and we trust they will do so.

The general Nursery Stock of Messrs. Veitch and Son includes many thousands of admirably grown young forest trees, innumerable ornamental trees and shrubs in pots, fruit trees of every description, trained trees an extensive collection, pines, and even pine-apples. In a word, nothing that can be expected from a nursery is wanting in this establishment. No man in the profession of gardener or nurseryman was more respected than the late Mr. John Veitch, who founded this family and nursery; and his descendants show themselves worthy of such a parent.

Summerland and City Nursery, Exeter; C. Sclater and Son. Sept. 30. 1842.— The grounds are of considerable extent, and remarkably well, as it appeared to us, furnished with fruit trees. Mr. Sclater, jun., informed us that they have a very extensive collection of hardy fruits, with specimen plants of each kind bordering the walks. They have a new kind of grape from America, producing a very fine fruit with peculiarly agreeable flavour, and a most powerful perfume. They have some superb kinds of raspberries, and a great many articles from America, received through the kindness of Major Knox of Lindridge. Among these is a potato which may be said to produce two crops a year, as, when the first-formed tubers are taken away early in summer, a second set is produced late in autumn. This, however, is an old practice, both in Scotland and Lancashire. This potato is so prolific that Mr. Sclater thinks it will produce 3 cwt. per square yard, which is 33 tons per acre! Among the hardy trees and shrubs we noticed various good articles: Mahòn*ia* *A*quifòlium, with extraordinary large foliage and fruit; Andrómed*a* floribúnda, large specimens; large plants of *A'*rbutus procèra, *A*. *A*ndráchne, *A*. tomentòsa, &c., new unnamed kind from America; Gledítsch*ia* hórrida 15 ft. high, and 3 ft. in circumference, a very singular object, from the number and largeness of its spines, which we mention in order to recommend this tree for introduction among odd specimens on lawns, or in glades in drives or pleasure-grounds. Escallònia montevidénsis, remarkably fine specimens; Magnòlia Thompsoniàna conspícua and fuscàta, from 10 ft. to 15 ft. high; Adenocárpus intermèdius (*Encyc. of Trees and Shrubs*, p. 228. fig. 370.), 4 ft. high, a very beautiful free-flowering evergreen shrub from Portugal, flowering from April to November, and ripening seeds, deserving a place in every collection; Cunninghàmia lanceolàta 10 ft. high; Pìnus austràlis, a fine specimen; a great many camellias, some of which have attained a large size in the open ground; Mùsa Cavendíshii, a collection of Orchídeæ, and many other hothouse plants; florist's flowers, including two beds of named tulips, each conraining 93 rows; a hybrid Russian anemone, and innumerable other articles.

We were much struck with the vigour of the raspberry plants; and a Dutch variety was pointed out to us which produces a much larger fruit than any in common cultivation. We noticed some plantations of cabbages of different kinds, respecting which Mr. Sclater, jun., gave us the following information.

" *The Paington Cabbage* is a very large and valuable kind, cabbaging very early, and frequently weighing from 20 lb. to 28 lb. The flavour is very superior, not having the least degree of coarseness, although it is so very large, In my opinion there is no other kind of cabbage to compare with it in that respect. It should be grown in a very strong rich loam, the plants to be 3 ft. apart every way. I have frequently seen the cabbage in the market divided into halves and quarters for the convenience of purchasers.

" *The Cornish and Kentisbeare Cabbages* are smaller and earlier than the Paington, but are most valuable kinds, being very early, and not requiring such a strong soil as the Paington: they may be grown much closer, say 2 ft. by 18 in. For the cottager, these kinds are more desirable than the Paington, as they do not require so much space, and produce excellent sprouts for many months after the first heads are cut. These are the principal kinds of cabbages grown in this county for garden purposes.

" *The Nonpareil and Early Hope* are both very early cabbages, but small. They are of excellent flavour, can be planted very close, and are very suitable for small gardens.

" *The Vanack, Wellington, and Imperial* are also very excellent and profitable kinds of cabbage, in consequence of their giving a second, and frequently even a third, crop of very good heads from the sides of the stem. There are many other kinds grown in this neighbourhood; but I consider those named above are the very best.—*J. S. S. Oct.* 1842."

DORSETSHIRE.

Merriott Nurseries, near Crewkerne; John Webber.—Cinerària Webberiàna, Paxt. Mag. of Bot. for July, 1842. A beautiful hybrid. (See *Gard. Mag.* for 1842, p. 415.) Azàlea índica Victòria, flowers of a light purple, and a profuse bloomer, with a weeping habit, the branches hanging down over the pot so as to cover it.

GLOUCESTERSHIRE.

The Durdham Down Nursery, Bristol; Garraway and Mayes.—We made a flying visit to this nursery on October 1. 1842, and were only able to devote an hour to what would have required a whole day. In the laying out of the nursery, no expense has been spared to combine ornament with utility; and every part is executed in the most substantial manner. The whole is judiciously thrown into compartments by main and secondary walks, and along the former are rows of specimen trees and shrubs, mostly named. There are hundreds of specimens that we should have taken notes of, if we had had time. The plant-houses are numerous, well constructed, and in good repair; and the masses of rockwork and basins of water are, in regard to design and taste, of a very superior description.

Cirencester Nursery; W. Gregory.—An excellent whole sheet catalogue of this nursery has the plants arranged as forest trees, fruit trees, and ornamental trees and shrubs, which occupy the greater part of the catalogue, with notices of stove plants, Orchídeæ, Cácti, greenhouse plants, herbaceous plants, and florist's flowers. To all the trees and shrubs the prices are affixed. We regret we have not yet been able to visit this very complete establishment.

HAMPSHIRE.

Rogers's Nursery, Southampton.—*The Durmast Oak* (Quércus pedunculàta var. Durmast), Mr. Rogers informs us, is readily distinguished by the male catkins being of a grey colour, while the trees having red or reddish catkins are not the durmast variety, but the species. The leaves are broader, more pointed, and less deeply sinuated than those of the species. The value of this variety of oak has been noticed in our preceding Volume, p. 656. In mixed plantations, Mr. Rogers recommends planting an oak in every fifth space, which gives an oak to every pole, or about 360 to an acre. If the soil and situation are adapted to the growth of oak, he plants no other kind of tree; finding, from experience, that the oaks shelter one another, and that the thinnings, on account of the value of the bark, and the solidity and durability of the oak poles, are far more profitable than the thinnings of any other kinds of trees that may have been planted as nurses. When he plants oaks alone, he puts in from 5000 to 7000 plants per acre. After the plants are thinned to the distance of a rod apart, or 360 per acre, they are allowed to remain until they become full-grown timber. We have lately introduced the durmast oak and the Pìnus austrìaca extensively in Suffolk.

(*To be continued.*)

ART. V. *The Mode of planting early Potatoes in the Neighbourhood of Garstang, with a new Planting-Machine.* By M. SAUL.

" We live to improve, or we live in vain."

HAVING had several opportunities of seeing potatoes planted by this mode in the present year, and the crops produced appearing to be excellent, I am induced to describe the method to you, for, although not new here, it may be so to some of your readers. It is simply this.

The ground is first prepared in the following manner. A trench is made at the end of the bed about 6 in. deep, and the manure laid therein; then another trench is made, and the earth laid upon the manure in the first to about the depth of 6 in. above the manure; then manure is laid in the second trench, and covered with earth in the same way as the first; and this is repeated till the whole bed is done.

The next thing is to plant the potatoes, which is done in the following manner. A line is drawn across the bed; the operator then takes the planter shown in *fig.* 2. It is about 2 ft. 6 in. long, with a handle on the top; the bottom end is rounded off; a bar goes through the upright about 6 in. from the bottom as a gauge for the depth it is to go into the earth, which is just far enough to reach the manure. One foot is placed upon the cross-bar, and presses the planter down into the earth till the cross-bar reaches the top of the bed; it is then withdrawn with the left hand and the potato dropped into the hole. This part of the process may be done by a boy, or an aged person, with ease and despatch. After the bed has been planted it is raked over, which draws the earth over the holes, and closes up the potatoes. When they have sprung up high enough for earthing-up they are hoed, which brings the manure between the rows close up to the plants. This manure is very beneficial by keeping the earth open; and, being washed in by the rain among the loose earth, is a great advantage for the potatoes setting and growing.

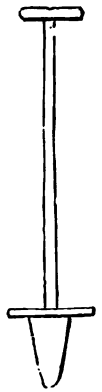

Fig. 2. *The Lancashire Potato-Dibber.*

The following is the greatest produce we have on record from three roots of potatoes. The competition produced considerable interest at the Leyland (near Preston) Agricultural and Horticultural Association, which met Oct. 26. 1841. There were four competitors for the prizes. The first was obtained for a basket containing 67½ lb. of potatoes from only three roots of Kemp's Seedling: they were grown by Mr. Rose, jun. The second prize was taken by Mr. J. Lovett, jun., Leyland; his three roots produced 66½ lb. The third prize was given to Mr. J. Ashcroft, Leyland; his three roots produced 61 lb. The fourth was awarded to Mr. J. Leyland; his three roots produced 60 lb. This Kemp's Seedling is a most excellent potato, and always fetches a high price in the market for its quality; it is considered fit for succeeding the first early potatoes.

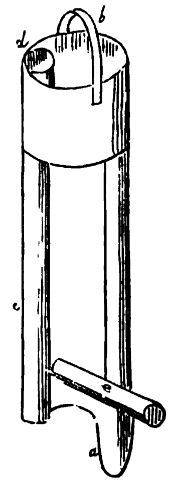

Fig. 3. *Saul's Potato-Planting Machine.*

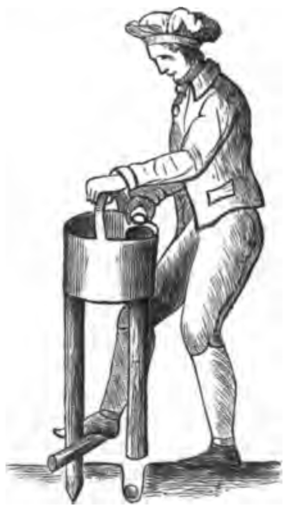

Fig. 4. *Saul's Potato-Planting Machine in use.*

I have enclosed a sketch (*fig.* 3.) of an improved potato-planter. The improvement is this. It is made of tin. On the top there is a pan for holding the potato sets. The part *a* first makes the place where the seeds are to go into; the machine is then raised by the handle (*b*), and moved forward so that the tube (*c*) may come over the place made by *a*. The seed is then put into the tube at *d*, which conducts it to the place made for it by *a*. By this method there is no stooping, because the sets are in the top of the planter ready to be put into the conducting tube (*c*). You will see at once the object of my improvement; and you may say it is strange that this improvement should not have been made long ago. The part *e* is for the foot to press the planter into the earth, as before described.

Fig. 4. shows the planting-machine in use.

Fort Green Cottage, Garstang, July, 1842.

[We expect to be able to give another article by Mr. Saul, on the culture of the potato, in our next Number.]

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Destroying Wasps.— This year I tried, and succeeded wonderfully, in destroying the queens. They are well known by every naturalist to be the only breeders. The method I adopted is the old simple one of hanging bottles partially filled with sweetened water against the walls, in the spring of the year, about the time when peaches, apricots, &c., are in bloom; before food for those noxious insects becomes plentiful, and while they are glad to seek out any thing in the shape of sustenance. The water in the bottles, while fermenting, attracts them; and, on their going in to drink, they are almost in every instance destroyed. By the above-mentioned means I killed between 200 and 300 queen wasps, thereby causing a great diminution in the number of nests this summer. While other people have had upwards of one hundred wasps' nests to destroy, I have not had more than a dozen, although situated in the midst of plantations where they might, almost undisturbed, increase to an alarming extent. — *John Armstrong. Belmont, near Durham.*

Clématis azùrea grandiflòra must rank as the queen of hardy climbing plants. It is a rampant grower; its hardiness is indisputable; its large star-like flowers are matchlessly showy, and so suitable is our climate to its growth, that this year my plant, which climbs an Irish yew, has produced perfect seed. Clématis Siebóldi is entitled to be the fairy queen of the same class of climbers, from its slender growth and delightfully beautiful flowers.— *Richard Tongue. Forton Cottage, near Lancaster, Oct.* 2. 1842.

Art. II. *Foreign Notices.*

NORTH AMERICA.

Shephérdia argéntea Nutt. — Some of our readers will recollect that this was recommended as a fruit tree by Mr. Russell in our Volume for 1831, p. 570. Desirous of knowing how far the tree was maintaining its reputation as a fruit tree, we wrote to Messrs. Winship, nurserymen at Brighton near Boston, U. S., who were said by Mr. Russell to be the only cultivators of the tree in 1831, and the following is an extract from their answer: —

"We are glad you are about to notice a plant which has always been held in the highest estimation by ourselves, as one of the most beautiful, ornamental, and useful fruit-bearing productions in nature. The Shephérd*ia* argéntea, or buffalo-berry tree, in our nursery, which was 14 ft. high in 1831, is now 20 ft. high, 29 in. girt at 2 ft. from the ground, and its branches cover a space 28 ft. in diameter; that is, 14 ft. on each side of the main stock. It is a female plant, and requires the proximity of the male plant; but the distance is immaterial while the pollen can be communicated by the wind, or conveyed by a peculiar insect, in appearance like the common bee, but only about one quarter the size. It will not mature fruit without the male. The cultivation of it has been extensive. We have disposed of 20,000 plants, and as fast as the male and female characters of the plants could be ascertained by the blossom buds. The tree is propagated by layering or by seeds; lately, altogether by seeds. We have recently sold them at 50 cents per plant, formerly much higher. We have not sent any to Europe, but should be disposed to sell a thousand, or thousands, to any person you might recommend, to sell upon equal shares, and receive our payment in nursery plants from England: that is, one half of the amount of sales to our credit, to meet our orders as for the amount above stated. Unfortunately we cannot send any fruit this season: we did not take our usual precaution of covering the tree with a net, and those little warblers and depredators, the birds, had taken all the fruit prior to our reception of your favour. Another year, if you desire it, we will send you specimen clusters of the fruit in any way you may prescribe.

"We enclose two sprigs of the Shephérd*ia*, male and female: the large flowering buds are those of the male, the small ones of the female. The fruit is of the size of the red currant; a brighter red, richer, and more nutritious. It is a fine eating fruit after the frost has operated upon it. It is also a very superior fruit for jellies, jams, &c. Picture to your imagination a tree containing a mass of fruit, the little specimen twig enclosed producing a cluster of 1½ in. in diameter, close and compact, even to hardness; fancy a large tree thus loaded, every branch and twig, with a bright and shining fruit, and you may form some idea of this unsurpassed and beautiful production from the American Rocky Mountains, discovered, as you must be aware, by that excellent man Nuttall, and named after his intimate friend Mr. Shepherd, formerly curator of the Liverpool Botanic Garden.

"We shall be much gratified to hear from you frequently, and by the Liverpool line of steamers for Boston, directed Messrs. J. and F. Winship, Brighton, Mass., U. S. A." — *J. and F. Winship. Oct.* 1. 1842.

[The specimens sent were of *E*læágnus argéntea *Pursh*, Arb. Brit. and Hort. Soc. Garden; and it would therefore appear that the *H*ippóphae argéntea is not a synonyme to Shephérd*ia* argéntea. Some plants of each sex of the Shephérd*ia* have been ordered by Messrs. Whitley and Osborne of the Fulham Nursery.]

ART. III. *Retrospective Criticism.*

TRANSPLANTING large Trees. (p. 387.)—I was much pleased with your opinion on transplanting large trees without any previous preparation of their roots, given in the August Number of the *Gardener's Magazine*, p. 387., by thinning out their tops at the time of transplanting, which is perfectly correct, according to my practice. I have been obliged, upon the spur of the moment, and no doubt many other gardeners have been so obliged, to remove trees that had received no previous root-pruning preparation; and I have seldom failed, when a due proportion of the branches and young spray has been cut out at the time of transplanting. The general quantity removed has been one half or more of the head of the tree. This is done, not by cutting out large limbs and mutilating the tree, but by a careful and regular thinning of the whole head, much in the same way as in thinning and pruning standard apple trees, so as to leave the general outline of the tree the same as it was before pruning; in fact, at a distance, the head looks better and more regular than it did before the operation. I am further convinced, although not by actual experience upon similarly prepared trees, that, had the trees at Allanton been pruned in the above manner at the time of their removal, their effect upon the scenery would not have been deteriorated, whilst their larger and healthier foliage in immediate as well as after years would have been more pleasing, and left no cause for the observations in *Strictures on Steuart's Planter's Guide*, quoted in the *Gardener's Magazine*, vol. vi. p. 91.

There are many fine old ornamental trees to be found in parks, &c., apparently verging to decay, which might be renovated, at least for a few years, were their tops regularly thinned out so as to throw fresh vigour into the remaining branches; and, in those districts where faggots are in request, the prunings would pay the expenses. Trees in demesnes by the sides of public roads are sometimes to be seen in want of this kind of pruning, in consequence of much of the rain that falls, and which ought to go to their roots, being carried off without penetrating the soil. Young trees from the nurseries are also much benefited by pruning at the time of planting; not by removing a certain quantity of the lower branches and leaving those near the top untouched, but by a regular thinning out of a portion of branches all over the plant, and shortening some of the more straggling shoots of those left, particularly two or three of the stronger shoots near the top, in some kinds of trees, which seem to contend with the leading shoot for leadership. The lower branches should only be gradually removed in after years, as the trees advance in growth. By keeping the heads regularly thinned, the trees, while in a young state, are less exposed to be tossed about with the wind, than if they were only to have their lower branches cut off, giving them much the appearance of long birch brooms, with their handles stuck in the ground. (See some of the young trees in Hyde Park, between Knightsbridge and Kensington.) Were the young plantations partitioned off in Hyde Park, it would be an excellent plan to give the different methods of pruning a trial, by pruning each partition in a different manner; and, from observation in that public situation, the most successful methods would soon be introduced throughout the country. The above remarks do not apply to the fir tribe; they do not seem to be benefited by pruning; and branches once removed from them never push out again, while the hard-wooded deciduous trees do again push out shoots in abundance where smaller branches have been removed. —*E. B. Oct.* 24. 1842.

Comfortable Habitations for the Poor with Gardens attached. (Vol. for 1842, p. 637. to 642.) — I entertain the hope that the nobility and gentry will become alive to this important subject, and numbers of them are so already. But many small capitalists in country places find a profitable investment for their little moneys in buying old stables, and outhouses of various kinds, and converting them into human habitations. A large old cottage, originally adapted for one family, will be divided into three or four tenements, with scarcely any garden ground to each. For these, the allotment system of the Labourer's Friend Society seems to be especially adapted. However, nothing can compensate the moral evils resulting from crowding families together; and men, finding their houses uncomfortable and no garden employment for their spare time, resort to the beer-house and the public-house, and are thereby debased and degraded, and, in fact, ruined. I know of no remedy for this, but by the nobles and gentlemen of England having such comfortable cottages as you design and recommend erected for the use of all young and newly married people. — *T. M. Reigate, Dec.* 16. 1842.

THE

GARDENER'S MAGAZINE,

FEBRUARY, 1843.

ORIGINAL COMMUNICATIONS.

Art. I. *On Horticultural Exhibitions.* By James Barnes, Gardener to the Right Hon. Lady Rolle.

Having all my life been engaged in gardening, and having been anxious to see the skill and industry of gardeners rewarded, I have carefully watched for many years the effect of the encouragement given at horticultural exhibitions to working gardeners. If the conclusions that I have come to differ from those arrived at by some of my brethren, I trust the circumstance will not be attributed to any partiality on my part, but rather to a want of more extended observation and experience.

The general impression on my mind is, that, under the present system of exhibiting, it very rarely occurs that either skill or industry gets properly rewarded.

For instance, at our principal leading exhibitions, encouragement is held out for the production of certain articles, no matter what may be their native country, the part of England they come from, who may exhibit them, or how long they may have been in the possession of the exhibitor, provided only he has had them long enough to make them his property. For this purpose, it will be sufficient if they have been purchased the very morning of the exhibition; and I can state with confidence, that some of the leading exhibitors of the present time never think of growing the productions they exhibit, but scour the country over in search of them, to the no small satisfaction of the nurserymen from whom they are purchased. Whether this shows a taste for horticulture, or a taste for exhibiting, I leave others to determine. What chance has a gardener who grows his plants from their infancy with exhibitors of this kind, who can show, at every exhibition, a dozen of plants for his one or two? A number of respectable men get chosen as judges for such exhibitions, who very often are totally incapable of estimating the merit of the articles for want of practical knowledge. Horticultural exhibitions have, no doubt, done good by stimulating to exertion, but, for some time past, I have thought them degenerating into something like horse-racing.

It has been my opinion for some years, that, to reward the skill and industry of a gardener properly, the whole of the plants and gardens under his charge ought to be taken into consideration, by a committee of practical gardeners like himself. These ought to examine the fruits and vegetables which he raises, to see whether they are of good kinds, well grown, healthy, and without insects or diseases; to observe the order and beauty of his flower-gardens, pleasure-grounds, walks, and, in short, every thing under his care, from the stoke-holes of the furnaces, and root-cellar, fruit-room, onion-loft, and tool-house, to the botanic stoves and conservatories. Then let him only be rewarded who excelled in the greatest number of things, taking his place altogether; and had not only the best productions, but exhibited the best order and highest keeping. If something of this kind were set on foot, I am persuaded it would be a greater stimulus to improvement in gardening than the present mode of giving premiums for fine specimens, which are generally either produced by gardeners to the neglect of almost every thing else under their charge, or purchased by their employers in the spirit of gambling. At the same time, I would not altogether give up awarding prizes for single productions; but I would do this under such regulations as would insure their being grown by the exhibitors.

Bicton Gardens, Dec. 1842.

ART. II. *Bicton Gardens, their Culture and Management. In a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 34.)

LETTER VIII. *The Flower-Gardens. List of Plants.*

THE first thing you noticed in the flower-gardens here was a peculiar sort of broom I have had made for sweeping up the grass walks, &c., the most useful and expeditious I have ever met with. I have light handles from 4 ft. to 10 ft. in length made to fit, which we adapt to the nature of the sweeping. If it is in hot summer weather, the grass short and dry, we use a handle of 10 ft. My largest size measures from side to side 4 ft., and the length of the centre is 3 ft. 6 in. Being thin and light, they easily sweep up all loose rubbish, and always keep themselves clean and dry. A man will soon brush over a large space; and at this season of the year, when there are a few loose leaves blown about, you have no idea how soon several acres can be swept over with these brooms, and the place made neat and tidy very quickly. To see the great bundles of rubbish tied to a stick, in many places, to be used as brooms, is surprising; and, when soaked with wet and dirt, a man carries it without being able to do any work at all. I call mine the hen and chickens broom. I will enclose you a small rough model of one. [*Fig.* 5. is taken from the model; the separate broomlets are tied with brass wire.] You will perceive that the short fine birch, heath, or whatever you choose to make brooms of, is first of all collected and divided into the different lengths, and the longest of it is used for the middle. I have some made with two chickens on each side of the hen, others with three on each side. I make brooms of three different lengths to suit the weather, and heavy or light work, which you will readily understand. If it is a long broom, each chicken has two bands bound round it, the hen three; then they are all bound together to be ready for handling.

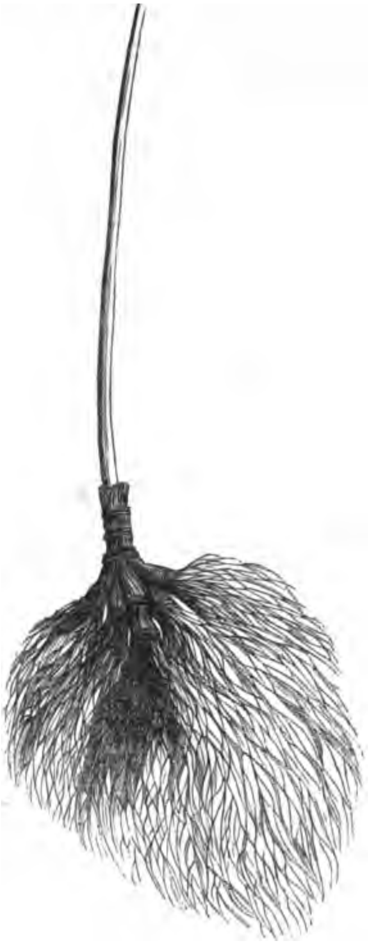

Fig. 5. *Fan Besom in use in Bicton Gardens.*

The following are a few of the specimens in the flower-gardens here: —

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
Araucària imbricàta, handsome, branched quite down to the ground - -	11	10	36	0
Yúcca grandiflòra -	12	3		
A'bies Doúglasi, branches to the ground - -	25	0	82	0
*P*ìnus Larício -	15	0		
Sabin*iàna* -	20	0	54	0
*P*ìnus palústris [austràlis *Arb. Brit.*]	10	0		
*C*èdrus *Deodàra* -	12	0	38	0
Rìbes speciòsum, very large				
níveum do.				
glutinòsum -	8	0	16	0
*m*alvàceum -	7	6	32	0
aúreum - -	6	0	18	0
lanceolàtum -	7	0	8	0

Large clumps of the new scarlet rhododendron, including *R.* arbòreum, altaclerénse, nepalénse, Noble*ànum*, pulchèrrimum, campanulàtum, Glenni*ànum*, barbàtum, the Victoria rhododendron, and most of the new and valuable sorts. Many large camellias, of different varieties, from 5 ft. to 6 ft. high, and large round heads well furnished with flower-buds.

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
Edwárds*ia* microphýlla -	5	0	12	0
grandiflòra -	9	0	30	0
chilénsis -	6	0		
Deùtz*ia* scàbra -	6	0	12	0
Photínia serrulàta -	8	0	15	0
Sophòra jap. péndula	16	0	14	0
Cállitris japónica -	7	0		
*A′*rbutus *U*`nedo *s*alicifòlia				
hýbrida - -	9	6	28	0
procèra - -	10	0	25	0
*l*aurifòlia -	12	0	28	0
Aristotèl*ia* Mackà*ii*	12	0	63	0
variegàta -	11	0	64	0
Escallòn*ia* rùbra -	4	6	32	0
montevidénsis -	6	0	52	0
floribúnda -	6	0	40	0
glandulòsa -	8	0	57	0
illinìta - -	6	0	27	0
and large plants of other sorts.				
*C*upréssus lusitánica	14	0	48	0
*t*hyöìdes - -	8	0	20	0
and many other *C*upréssi.				
Bérberis pinnàta *Lag.* [Mahòn*ia* fasciculàris *Dec.*, and *Arb. Br.*]				
Be. *e*mpetrifòlia				
asiática, large.				
dúlcis				
atropurpùrea, &c. &c.				
*R*úscus andrógynus, fine.				
*R*ùbus spectábilis				
*C*ýtisus falcàtus purpùreus				
*L*abúrnum incìsum				
*C*ydònia sinénsis				
japónica				
Medicágo arbòrea				
Callistèmon semperflòrens -	8	6	20	0
Arália spinòsa -	10	0		
Fontanès*ia* *p*hillyreöìdes, a most beautiful shrub -	4	6	34	0
Taxòdium dístichum	6	0	18	0
*J*uníperus excélsa, very fine.				
recúrva				
*t*amariscifòlia				
chinénsis				
phœnícea				
suécica.				

Heìm*ia s*alicifòlia, very fine, with thousands of beautiful yellow flowers expanded at this time. To all appearance this plant has been standing for many years in the most exposed situation in the flower-garden. The reason why I am so particular in describing this beautiful plant is, that some of our clever men tell us decidedly that it is a tender plant. We have also large plants of *C*lématis cærùlea, *C.* Siebóldt*i*, Vést*ia l*yciöìdes, Casuarìna *e*quisetifòlia, myrtles of various sorts, and plants of different sizes; but, if I were to tell people in the neighbourhood of London that myrtles are to be seen in Devonshire 25 ft. high, I should not be believed; but it is so. Magnolias of all sorts and sizes, and, as standards, in all directions; even Magnòl*ia* fuscàta standing out, and flowering most part of the year. Two walls, each of them 230 ft. long, which enclose the flower-garden, covered mostly with M. g. exoniénsis, with hundreds of blossoms out daily. Several very fine plants of Azàlea índica álba, flowering in May in the greatest profusion. Several large plants of Wistàr*ia* chinénsis, covering trellises, running up poles, &c. Leptospérmum baccàtum, 12 ft. high and 22 ft. in circumference; there are also several plants of it from 4 ft. to 9 ft. You observed you had never seen such large leptospermums growing out of doors before. Sóllya longiflòra, covering a large surface of trelliswork. Likewise several rare plants, of the names of which I am not quite certain, and others whose names I do not at all know yet; but I will send you a few specimens, as you were kind enough to offer to find out the names for me.

You noticed the number of Maltese vases in the flower-garden; the busts in niches outside the temple, the Duke of Wellington's in the most conspicuous place; with one of Sir Walter Raleigh, whose birthplace is in sight of the flower-garden, and whose property is now a part of this demesne; also a bust of the hero of Trafalgar. You observed the marble fountains, the shape and furnishing of the flower-beds, the green terrace walks and slopes, terminating with the little parish church, not seen till you approach it closely; and, as you noticed all these things, I shall not dwell upon them.

Bicton Gardens, Oct. 10. 1842.

LETTER IX. *Importance of Cleanliness. Manure Water. Charcoal.*

THE necessity of cleanliness amongst plants is universally acknowledged, but very partially practised. Dirtiness is the parent of all disease. What is more disgusting than a dirty dwelling-house? It becomes a harbour for all kinds of disease and vermin; but, if you keep it clean, you will not be plagued with either. There will be no food for flies and wasps, and none for the spider. So it is with all vegetation: it is only from our neglect that plants become covered with disease and vermin. I have seen, it is true, some few things a little improved within the last twenty-five years, but nothing is yet brought to that degree of perfection which it might be. Why is it so? Because, in my humble opinion, we often act in direct opposition to nature. Those who fancy they have made a new discovery, wishing to be considered more learned than their neighbour, do not assist him, but keep the secret to themselves, that their neighbour may not try to make some improvement on what they consider as their invention. In unfolding my small and humble store of knowledge, I do not do so for gain of any kind to myself, nor am I doing it for a name, for if you think it right to withhold my name, do so; only it may be desirable, perhaps, for my brother-gardeners to have some authority to refer to, as I mean to relate nothing but what I have put into practice fully; and I do not care who examines me. Perhaps I may not sufficiently explain myself, but the sooner I endeavour to do so the better.

Is it not disgusting to go into a house of fruiting pines and see them covered with scale and coccus of all kinds; and to smell black and yellow sulphur, black soap, and many other fetid drugs? I have seen such fruit sent to noblemen's and gentlemen's tables as I have not considered wholesome to eat; such as I would not have tasted myself. Houses of grapes covered with coccus, red spiders, and other vermin; the bunches shanked, cankered, and mildewed, &c. Can such fruit be wholesome to eat? I have seen melons, cucumbers, and other things in the same way. Whose fault is it? Not nature's, but those who had the charge of the plants. Now, the grand secret is to sweep, brush, and mop; to use pure water and pure soil, with a proper drainage. These are the preventives for all kinds of disease and vermin. Well, but how are we to clean the already foul and diseased collection of fruit and plants? I will tell you, and in doing so state nothing but facts; but you must persevere, or you will not conquer. You must give your hothouses, greenhouses, forcing-houses, pits, and frames, air before the sun comes on them, and keep every thing properly watered; and, to clean and expel the present stock of vermin, you must use clean hot water from 140° to 150° Fahrenheit. Cut a bit of cloth into a circular shape, a little larger than the pots, and insert in its circumference a string to draw and tie round the rim of the pot; put a good handful of moss underneath the cloth, so as to keep all tight together, and prevent the earth from falling out, and the hot water from getting to the roots of the plants, &c. The cloth must be cut in the manner shown in *fig.* 6., with a slit or opening half-way across it, to admit the stem of the plant to pass through. Then tie it up quite tight, and apply the water with a syringe. I find that water heated from 140° to 150° Fahrenheit is sufficient to kill or expel any kind of mealy bug, coccus, scale, or vermin whatever, but not by one application; for, if the plants are very dirty, the insects will in time reappear from the crevices where they had taken refuge. You must, therefore, persevere in repeating the syringing with hot water, and you will have the pleasure of seeing your plants become clean and healthy. Pray observe that, if the plant is in a growing state, you must not use the

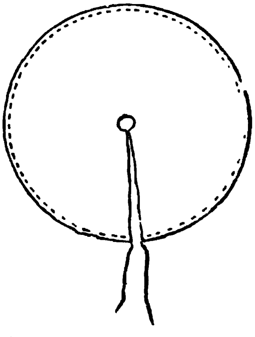

Fig. 6. *Cloth for tying over the Surface of Pots.*

hot water in a close place, for it will sometimes touch the young and tender leaves and shoots. Beware of that. When the plant has been stunted and starved, I have applied the water as high as 154°, and the vermin came off like the peelings of onions, and the plant acquired new life, and grew afterwards amazingly; but if you should use the water at 150° in the spring of the year, when the plants are growing freely, and the foliage and the shoots are young and tender, more especially if the place where you use it should be close, and the steam cannot get away quickly enough, the plant will be scalded. On the other hand, if the plant be taken into a shed, or some such place, or if you give the house in which it is a little air, there is not the least danger of scalding, and the plant will derive wonderful benefit from the syringing. I manage thus: I get two bricks, lay them in such a manner as to support the pot, and place it between them, the rim of the pot resting on the two bricks, so as to admit of the plant being raised or lowered in an oblique position without touching the ground (see *fig.* 7.): this will also admit of turning the plant round at pleasure, so as to allow of syringing every part of the plant, as well over the surface of the leaves and heads of flowers, as on the under side of them, so that hot water may touch every part of the plant except the roots. Syringing answers better, according to my own practice, than pouring on the water from a watering-pot, which would probably scald the plant, in the same manner as dipping it in water would do. For instance, if you syringe water at 150° heat against the back of your hand, it will only give you a smarting twinge for a moment; but if you dip the other hand into the same pot of water, it will scald it severely. Practice will soon teach you, if you persevere.

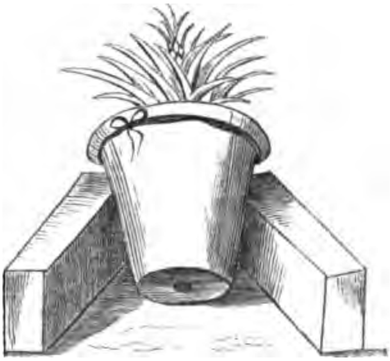

Fig. 7. *Mode of placing Plants in Pots when they are to be syringed with hot Water to kill Insects.*

Manure Water. — What is it? It is composed of sheep-dung, cow-dung, soot, lime, and nitrate of soda, all mixed together, to be applied to the constitution of the plant as we see it requires it.

And now for *Charcoal*, that astonishing material, that purifier of all things. I have proved the use of charcoal in some thousands of instances. Did I not point it out to you when you were here? I do not claim making the discovery, for I do not know but that thousands have seen the same effects of charcoal in woods as I have done, for I have seen it in different parts of the country for the last twelve years at least; but I have not seen it put into practice, nor heard of any person using it, until within the last eighteen months or so. As I have stated in my first letter [p. 558. of our last volume], I came to think of trying it because I saw nature making use of it. In a place where scarcely a bush or a weed would grow; where there was a yellow stiff clay, and the subsoil was a rock of clay and gravel; where the clay had been poached about in wet weather; and where rusty-coloured mineral springs oozed out and ran about, I have seen, from charcoal dust being put on it accidentally, the barren spot become rich and luxuriant. Was not that enough to make me look about, and consider if I could not turn this to good account? I did so, and I have used charcoal ever since, more or less, as I could get it. I put it in bags and place it in cisterns of water, and into the manured water; I mix it amongst the earth, and drain almost every plant with it; and I am perfectly satisfied of its attractive purifying qualities. I was a long time before I could understand so much about it; but now I shall continue to use it, and I hope to keep my plants in the same healthy state in which you have lately seen them.

Bicton Gardens, October 11. 1842.

Art. III. *How to make the most of a Cottage of only Two Rooms.*

By R.

Much has been said of late of mechanics' cottages, and some designs have recently been published of dwellings for this class of persons, that have contained *five* rooms; but we all know that mechanics in general (unless they depend on lodgers) have not the good fortune to enjoy this extent of accommodation. This is not the state of things that ought to be, but it is the state of things as they are; for many mechanics are obliged to be content with even one room, and they consider themselves well off when they have two. At the same time many liberal noblemen build houses for their labourers containing five rooms, and even more, with a deal of external ornament to boot; but this is the exception, not the rule; therefore we must try to make the most of a two-roomed cottage; and the accompanying plans are submitted for that purpose.

Fig. 8. is the plan of a two-roomed cottage before it was altered. It was originally a wheelwright's shop, and the landlord, in converting it into a dwelling, just put a fireplace in each end, and the division down the middle; the two windows were the shop windows, and the two doors were originally one

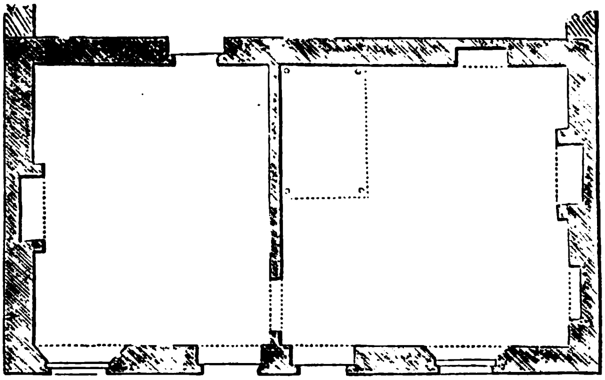

Fig. 8. *A Cottage of Two Rooms before being altered.*

large door for the wheelright. The out-buildings were made similar to those of *fig.* 9. There was no proper situation for a bed, and as soon as the door was opened the bed was exposed; besides, the rooms were very cold in winter from having no passage or inner door. The occupant wished to get rid of these grievances, as well as to have a kitchen, parlour, and bed-room (in effect), without the expense of building an additional room. To accomplish this I converted the house into *fig.* 9. by putting up a wainscot division in the east room (the building faces the south), making a closet in the passage, leaving sufficient room behind it for the length of a bed. Concealed beds are very much the fashion in Scotland, and I believe, too, in France. An upper chamber is, however, always preferable for a bed-room where it can be had; but when it cannot, a well-aired bed recess, with a neat curtain in front, leaves a sitting-room tidy, and conveys the idea of a respectable family. A window was made in the east end of the house, as the front window was too small, and the door of the west room was converted into a window. The occupant has been so well pleased with the new arrangement of his house, that he has had the parlour painted, papered, and carpeted. The exact amount of the mason's and joiner's bills was 6*l.* 10*s.* 3*d.*; and let landlords just look to the additional comfort that this small amount affords. I have not sent you the elevation, for it is not handsome, and has not been altered; but for the matter of 4*l.* 10*s.* I could beautify the exterior with lime, trellising, &c., so as to make the house an object of interest. In the improved plan (*fig.* 9.), *a* is the lobby;

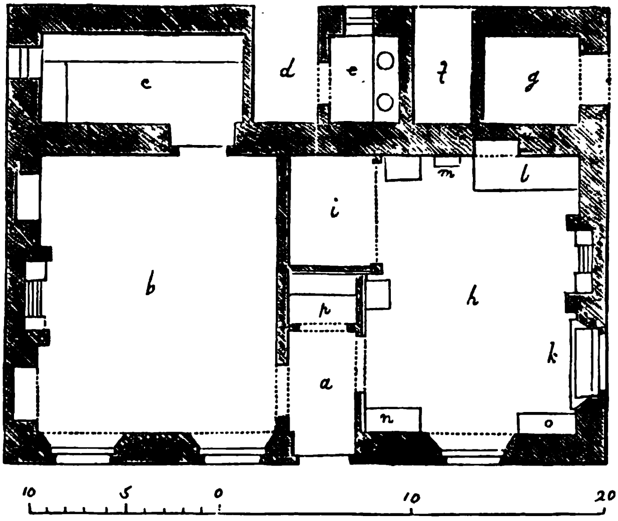

Fig. 9. *A Cottage of Two Rooms made the most of.*

b, kitchen, where a press bedstead might be put if there were any children; *c*, pantry; *d*, wood; *e*, privy; *f*, ashes; *g*, coals; and *h* is the parlour, in which is the recess for the bed (*i*) with a tasteful curtain in front. This recess is well aired by an opening through to the kitchen, close to the ceiling. To give some idea of the comfort of the room, I would just observe, that in the bottom of the new window there is a large covered box which serves as a wash-hand stand for the wife when there is any one in the kitchen, and for the husband on a Sunday while the wife is engaged in the other room with her culinary matters; it also serves to hold brushes, combs, &c., to prevent the room having the appearance of a bed-room, while the top, at other times, answers the purpose of a work-table. The sofa is placed at *l*, the clock in case at *m*, a chest of drawers at *n*, and tables at *o*. The closet (*p*) was made for holding clothes, linen, &c., and any thing that would, if left in the parlour, make it look like a bed-room.

We have recently converted an old barn into a comfortable little two-storied cottage; the outline happened to be of a form that was easily convertible into a neat simple old English cot. Shall I send it to you? [We shall feel very much obliged for it. Such communications are the more desirable, after what our correspondent T. M. has stated respecting the converting of old stables and outhouses into human habitations, and large cottages into small ones, &c., in p. 44.]

Derbyshire, July 13. 1842.

Art. IV. *Report on rare or select Articles in certain British Nurseries and private Gardens.* Drawn up from personal inspection, or from communications received. By the Conductor.

(*Continued from* p. 40. *and concluded.*)

Hertfordshire.

The Sawbridgeworth Nursery; T. Rivers, jun. — We visited this nursery Oct. 20. 1842, and were much gratified by the extent of the collection, the excellence of the soil, and the great vigour of the plants. So many curious things we have scarcely ever found in any nursery. Mr. Rivers makes an extensive tour among the Continental nurserymen every year; and, as these are continually straining every nerve to procure new varieties, he seldom returns without something new. Notwithstanding this, there are still a number of things in the Jardin des Plantes, particularly acers and *P*olygonàceæ, which are not in British nurseries, but which Mr. Rivers might procure through M. Camuzet. (See *Gard. Mag.* 1840, p. 394.) We do not give the names in the following list as entirely new, though some of them are so; we give them simply as those of articles which we thought at the time were noticeable from the vigour of their growth, comparative rarity, or from the large stock in hand. If we had more leisure and room, we should notice some of Mr. Rivers's propagating-houses, as being of very judicious and economical construction, in which he has applied Arnott's stove, and the British sheet glass, in a very economical and satisfactory manner. We have taken no notice of Mr. Rivers's collection of roses, because every body knows it to be one of the most comprehensive and select in this country. They are all named with zinc labels written on with prepared ink, which Mr. Rivers finds to remain quite clear after having been in use upwards of ten years. The ink used is not that invented by M. Teichmacher, and sold by Thompson and Gordon, Fenchurch Street; but one composed as follows: Nitrate of copper, 1 drachm; hydrochlorate of ammonia, 2 drachms; lampblack, 2 scruples; and water, 4 oz. This ink is very black and legible, and not so liable to produce a white crust as that of M. Teichmacher. After being written upon, the labels require drying in a hot sun, or on a stove, for two or three days; for, unless they are well dried, they contract a white crust, which soon covers the letters, and ends in obliterating them. Whenever this white crust appears, it should be rubbed off with linseed oil and flannel. The writing on these labels, Mr. Rivers observes, seems as if it would last for ever, for rain, frost, and sunshine seem to have no effect upon it. A cheaper label, either for a private or public garden, cannot well be.

R*anunculàceæ* C*lematìdeæ.* — *Clématis Viticélla màjor.* A variety with very large blue flowers; a beautiful climber.

*Clématis macropétala, A*trágene macropétala *Ledebour*. Has not yet bloomed here. Habit distinct. Belgium.

Berberàceæ.—Bérberis *petiolàris* Wallich. H. S. "This is a very distinct species, with the largest leaves of any of the simple-leaved berberries yet introduced. It is from the North of India, and quite hardy. It was first raised in the gardens of the Society from seed received from Dr. Royle." — *G. G.*

Bérberis *vulgàris spathulàta.* A slender-twigged variety, very distinct.

B. *vulgàris fòliis purpùreis,* Encyc. of Trees and Shrubs, p. 1111. The purple-leaved Berberry. Its leaves and spines, in early summer, are of a deep purple colour, and the calyx of the flowers of a dark brown. A very elegant shrub. Belgium.

Bérberis *vulgàris Fischèr*ii. Has long slender shoots; deciduous. Belgium.

*Mahòn*ia *fasciculàris hýbrida*, M. rèpens fasciculàris, *Encyc. of Trees and Shrubs*, p. 53. Of fastigiate robust growth, the foliage very large, and the plant quite hardy. A fine variety.

Cistàceæ. — *Cístus.* A species from Mexico ; a curious trailing plant; has not yet bloomed. " It is the Heliánthemum glomeràtum of Sweet." — *G. G.*

Tiliàceæ. — *Tília europæ`a macrophýlla.* A magnificent variety, with robust shoots, and leaves of enormous size. Plants of the common lime raised from seed of the Dutch lime imported from France, are of a habit much more robust and fastigiate than those of the common lime when raised from layers, as it commonly is in this country. The leaves of seedlings also remain on the trees from a fortnight to three weeks later than they do in plants raised from layers.

*Ternströmi*àceæ. — Thèa Bohèa *màjor.* Seemingly a hybrid between *T. Bohèa* and *T.* víridis. Habit robust and distinct. Belgium.

A*ceràceæ.* — A`*cer palmàtum* H. S. Quite hardy in this nursery. *Encyc. of Trees and Shrubs*, p. 90.

Æsculàceæ. — *Æ'sculus Hippocástanum spectábile*, with very large leaves. Has not yet flowered. France.

Æ'sculus Hippocástanum flòre plèno Baumann. Forms a long spike of imbricated flowers. Has bloomed at Angers. It flowers were described by M. Leroy of Angers as much like those of Chionánthus virgínica, the fringe tree.

Staphyleàceæ.—Staphylèa Emòdi *Dr. Royle.*

Celastràceæ. — E*uónymus obovàtus.* A hardy evergreen species. Belgium.

E*uónymus rèpens.* A hardy evergreen species of horizontal growth, from Belgium.

E*uónymus europæ`us péndulus.* A curious weeping variety.

A*quifoliàceæ.* — I`*lex madeirénsis nigréscens.* A dark-leaved variety raised from seed here, seemingly much more hardy than the species.

I`*lex madeirénsis fòl. variegàtis.* A partially variegated variety from France.

I`*lex vomitòria.*

I`*lex castaneæfòlia* and I. l*igustrifòlia.* Apparently varieties of *I*`lex *Cassìne.*

I`*lex opàca recúrva.* Leaves recurved.

I`*lex æstivàlis* (*P*rìnos).

R*hamnàceæ.—Paliùrus Pallàs*ii. Belgium. " Probably the same as *R*hámnus Pallàsii, a species nearly related to the curious *R.* Erythróxylon, and seems intermediate between *R.* Erythróxylon and *R. l*ycioìdes." — *G. G.*

Ceanòthus hýbridus cærùleus. A hardy elegant shrub with blue flowers, between *C.* americànus and *C.* azùreus.

Ceanòthus hýbridus flòre cárneo. From the same source, with flesh-coloured flowers.

Leguminàceæ Lòt*eæ.* — *Spártium radiàtum*, grafted on the laburnum. The double furze has also flourished from four to five years on this stock. It was killed in the winter of 1837–8. The white Portugal broom and the common English broom, grafted on the laburnum, make singular plants.

G*enísta pilòsa*, grafted on the laburnum. Also a singular pendulous plant.

G*enísta púrgans.* A pretty dwarf hardy shrub.

G*enísta anxántica*, grafted on the laburnum. Forms an ornamental lawn tree.

C*ýtisus sessilifòlius* var. *stríctus.* A free-growing upright variety from France. Forms fine standards.

*Robín*ia *Pseùd-*A*càcia péndula.* Trained up, or grafted standard high, from a dwarf bush it forms a graceful semi-pendulous tree.

*Robín*ia *Gondouin*iàna. A curious dwarf variety with very large leaves.

*Robín*ia *hìspida màjor.* Forms a fine drooping tree when grafted standard high. It requires its shoots to be shortened twice in summer, to prevent damage from wind. If the points of the shoots are pinched out with the finger and thumb in June, the plant will bloom again in September. A beautiful tree.

Leguminàceæ C*assièæ.* — C*èrcis* S*iliquástrum flòre cárneo.* Has pale flesh-coloured flowers.

C*èrcis* S*iliquástrum flòre álbo.* Has flowers nearly white.

Rosàceæ *Amygdàleæ.*— *Amýgdalus commùnis grandiflòra.* Has very long leaves and large flowers.

Amýgdalus Pérsica *péndula*, the pendulous-branched Peach. Handsome.

Amýgdalus incàna, the hoary-leaved dwarf almond. A pretty shrub, not uncommon.

Amýgdalus Pérsica *nàna*, the dwarf Orleans Peach. Grows but two inches in a season, and bears fruit in pots.

Amýgdalus nàna flòre álbo, the white-flowering dwarf Almond. A handsome shrub.

Amýgdalus ispahàna flòre plèno, the double Ispahan Peach. With very narrow leaves and slender shoots.

Armenìaca vulgàris incìsa, the cut-leaved Apricot. France.

Cérasus Pàdus *péndula.* A distinct and interesting pendulous tree.

Cérasus Pàdus *heterophýlla variegàta.* A pretty variegated small tree, from France.

Cérasus Pàdus aucubæ*fòlia.* Has large spotted leaves, like the aucuba. France.

Cérasus Pàdus *rùbra*, the Cornwall Bird-cherry.

Cérasus Laurocérasus var. *stricta.* Raised from seed in Wilson's Nursery, Derby.

Cérasus Laurocérasus cólchica. A variety of the common laurel, with slender shoots, rather pendulous. Booth of Hamburg.

Cérasus prostràta.

Cérasus persici*fòlia.* Paris.

Cérasus græ̀ca Baumann. A very ornamental species.

Cherries are in this nursery grafted on Cérasus *Mahàleb*, for dwarf trees and for potting.

Rosàceæ *Spiræèæ.*—*Spiræ̀a Reeves*iàna and S. *árctica.* Dwarf shrubs, with white flowers. "*S*piræ̀a Reeves*iàna* Hort. is the *S*piræ̀a lanceolàta *Poir.*, *Bot. Reg.*, and *Encyc. of Trees and Shrubs*, p. 1114., a handsome nearly evergreen species, with rather large corymbs of white flowers. It appears to be quite hardy." — *G. G.*

Rosàceæ Ròseæ. — Ròsa *Bánksiæ spinòsa álba.* A very robust-growing variety; its vigorous shoots have numerous recurved spines.

Rosàceæ *Pòmeæ.*— *Cotoneáster denticulàta* and *C. marginàta.* Very pretty evergreen species. The latter has around its leaves a bright silvery margin, in which only it seems to differ from the former. "Cotoneáster denticulàta is very distinct from C. marginàta. The latter is nearly related to C. *b*uxifòlia, but differing in having larger and more marginate leaves, and is from the North of India; while the former has leaves nearly as large, resembling those of C. nummulària, and is from Mexico." — *G. G.*

Méspilus germánica var. *Neflier monstruèuse.* A large variety of the Nottingham medlar, which grows well grafted on the common thorn.

P*ỳrus* Sórbus var. *Sorbier de Neuilly.* Apparently a variety of *P*ỳrus *S*órbus with very large pinnated leaves.

P*ỳrus nìvea.* A variety of *P. À*ria resembling *P.* vestìta, but very hardy and robust.

P*ỳrus* À*ria latifòlia*, Encyc. of Trees and Shrubs, p. 434. P*ỳrus lanuginòsa* Ibid. p. 438. P*ỳrus edùlis*, Ibid. p. 433. All these grafted on *P*ỳrus *À*ria make fine ornamental trees; the last is rather a rare variety, and the fruit is good to eat.

Pears grafted on *P*ỳrus *À*ria unite well and grow freely, but they have not yet fruited at Sawbridgeworth.

P*ỳrus spectábilis Rivérs*ii. A variety obtained here from seed, in an attempt to fertilise the species with *P*ỳrus japónica. Flowers larger and deeper in colour than the species; habit more robust; leaves more rugose.

Granatàceæ.—Pùnica Granàtum *plènum màjus*, the *Grenadier Royale* of France, with very large flowers, and robust habit. A splendid variety. France.

Pùnica Granàtum álbo plèno. A double variety with "large double white flowers." France.

Pùnica Granàtum nànum álbo plèno, the dwarf double white Pomegranate. France.

Philadelphàceæ.—Philadélphus mexicànus. A pretty very dwarf species.

Nitrariàceæ.—Nitrària Schóberi. In sandy loam, salt occasionally applied. Killed in most nurseries in 1837-8.

Grossulàceæ.—Rìbes *Menzièsii.* A beautiful species, not common.

Rìbes *hýbridum.* A hybrid between *R.* aúreum and *R.* sanguíneum. Raised by D. Beaton. Pretty and distinct.

Caprifoliàceæ. — *Lonícera sempervìrens supérba.* A large-flowering variety.

Lonícera sempervìrens serótina. A vigorous-growing variety; blooms till November. From Mr. Young of Taunton, in which neighbourhood it was originated in 1837, or before.

Lonícera occidentàlis. Glaucous leaves, and orange-coloured flowers; very hardy and robust.

Lonícera Góldii. A variety of the above. "Lonícera (Caprifòlium) Góldii, if correct, is the same as Lonícera (Caprifòlium) pubéscens, and not like Caprifòlium occidentàle of Douglas." — *G. G.*

Lonícera aúrea. Quite distinct from L. flàva; grows more freely, with pale yellow flowers. Belgium.

Ericàceæ *Ericeæ.*—*A'rbutus.* From the Crimea; belongs to the *A.* Andráchne family, with deep red petioles. Has not yet flowered here.

A'rbutus magnífica, A. *prunifòlia,* and A. *magnolì*æfòlia, are hybrids from *A.* Andráchne.

A'rbutus Millèrii. A red-flowering hybrid, with the habit of *A.* Andráchne hýbrida. Bristol Nursery. See *Encyc. of Trees and Shrubs,* p. 575.

Ericàceæ Rhodòreæ.—*Rhododéndron lùteum.* With rugose evergreen leaves. Said to be a hybrid between *R.* caucásicum and Azàlea póntica. Habit dwarf and bushy.

Rhododéndron Adansònii Baumann. A new species; probably a hybrid of the *R.* azaleoìdes family. A pretty dwarf evergreen bush.

Rhododéndron azaleoìdes álbum. Flowers white. Belgium.

Rhododéndron Wilsònii. A pretty dwarf hybrid, with some apparent affinity to *R.* myrtifòlium.

Pernéttya floribúnda. A dwarf and pretty hardy evergreen shrub.

Pernéttya Cummíngii. A prostrate evergreen hardy shrub.

Oleàceæ Fraxíneæ. — *Fráxinus sp.* From Kamaon. Dr. Royle. "This is the O'rnus floribúndus of Dr. Wallich." — *G. G.*

Fráxinus excélsior glomeràta. Forms curious pendulous shoots. Found on a tree of the common ash at Stanstead Bury, Herts. When grafted on the common ash, it becomes a stiff glomerated dwarf tree.

O'lea excélsa. Grafted on the common privet.

O'lea europæ'a robústa. A hardy olive from the Crimea. H. S.

Ligústrum angustifòlium. Apparently a variety of *L.* vulgàris, with very long leaves. Belgium. "*Ligústrum* angustifòlium is not *L.* nepalénse, but is the Phillýrea robústa of Wallich, which was raised by Messrs. Loddiges. *L.* nepalénse is the same as *L.* vestìtum of Wallich, a plant with large broad pubescent leaves, resembling those of the common lilac." — *G. G.*

Ligústrum vulgàre buxifòlium. A very distinct and pretty compact variety; decidedly evergreen. From Mr. Smith of Worcester.

Ligústrum grandiflòrum. Evergreen, with pubescent foliage, seemingly half-hardy.

Oleàceæ Syríngeæ.—Syrínga *vulgàris grandiflòra.* A very strong-growing variety; the flowers are not larger than those of the species, but the spikes are very large-shouldered, like the bunches of some varieties of grapes: much like Lilac Charles X., but more robust. It forms a fine standard.

Lilac Prince Notger. A new variety from the Continent, with long pointed leaves; has not yet flowered here.

Syrínga *Emòdi*, Encyc. of Trees and Shrubs, p. 638. fig. 1244.; *S.* índica *Wall.* Quite hardy.

Jasmináceæ. — *Jasmìnum revolùtum* Ker, *J.* chrysánthemum *Roxb.*, *Encyc. of Trees and Shrubs*, p. 655. A pretty shrub.

Jasmìnum odoratíssimum, jonquil-scented. Remarkably fragrant, tender; deserves a place in every greenhouse.

Scrophulariàceæ. — *Búddlea séssilis.* A dwarf and tender shrub; has not yet flowered here.

Pentstèmon Scoúleri. On sandy soil, a hardy evergreen shrub.

Thymelæàceæ. — *Dáphne Cneòrum stríctum.* An upright-growing variety; raised from seed in France.

Dáphne Cneòrum grandiflòrum. A variety with broader leaves and larger flowers than the species. Raised from seed in France.

Dáphne lutetiàna. A hybrid raised in Paris: very fragrant.

Dáphne Aucklándii, *Encyc. of Trees and Shrubs*, p. 1117. Of the *D.* Gnídium group; with broader lanceolate leaves and a more robust habit than *D.* Gnídium. India, but hardy.

Dáphne collìna latifòlia. A distinct broad-leaved variety of *D.* collìna; raised in France. More tender than the species.

Elæagnàceæ. — *Hippóphae salicifòlia*, Encyc. of Trees and Shrubs, p. 669. fig. 1369.

Elæágnus triflòra, and E. *argéntea* (Shephérdia argéntea *Nutt.*). Shrubs; the first species scarcely half-hardy. E. *refléxa.* Belgium.

Artocárpeæ. — *Mòrus álba incìsa* Large serrated leaves.

Mòrus álba intermèdia. A hybrid of *M.* a. Morettiàna.

Ulmàceæ. — *Céltis cordàta.* Large cordate leaves.

Céltis áspera. Very narrow round leaves. Both sorts are raised from seed from the South of France.

Juglandàceæ. — *Pterocàrya caucásica.* A fine free-growing ornamental tree. The vigour of the plants of this species in the Sawbridgeworth Nursery was so much greater than what we had seen anywhere else, that we were quite astonished at them.

Salicàceæ. — *Sàlix americàna péndula.* A prostrate species [possibly *S.* purpùrea], with dark shoots and leaves glaucous on the under surface, forming a most elegant pendulous tree, when grafted on the broad-leaved willow with obtuse rugose leaves and purple shoots. Mr. Rivers does not know the species. It does not succeed on the narrow-leaved species of willow. It has been grafted on some species of *Pópulus*, but lives only one or two years at most.

Pópulus laurifòlia Booth. P. *viminàlis* Booth.

Betulàceæ. — *A'lnus jorullénsis.* A species from Mexico.

Corylàceæ or *Cupulíferæ.* — *Quércus pedunculàta fastigiàta víridis.* A variety of *Q.* p. fastigiàta with green shoots and light vivid green foliage, selected from seedlings raised here.

Quércus pedunculàta Hodgínsii, the Irish hybrid Oak. Retains its leaves, which are green, till the end of the year.

Quércus pedunculàta hýbrida H. S.

Quércus pedunculàta aùrea. Bright yellow shoots. France, 1841.

Quércus pedunculàta macrophýlla. Leaves very large and long. France, 1841.

Quércus sessiliflòra ambígua H. S. *Q. falkenbergénsis* Booth. *Q. pannónica* Booth.

Quércus E'sculus, Encyc. of Trees and Shrubs, p. 853.; syn. pubéscens péndula. A pendulous and beautiful variety of *Q.* pubéscens (*E'*sculus) received from France as *Q.* péndula nòva.

Quércus Cérris laciniàta. An elegant variety of *Q. Cé*rris from H. S.

Quércus Cérris càna. Habit dwarf and spreading.

Quércus Cérris fulhaménsis péndula. A weeping variety from seed here.

Quércus Æ'gilops latifòlia. From H. S. A distinct variety with larger leaves than the species.

Quércus álba var. *stricta.* An upright and free-growing variety of *Q.* álba, selected from seed here, and grafted on *Q.* pedunculàta.

Quércus Prìnus *castaneæfòlia* Meyer. Half-hardy evergreen ; leaves glaucous on the under surface. A beautiful species.

Quércus macrocárpa. A North American species, with acorns as large as Orleans plums.

Quércus macrophýlla. Distinct, with small acorns. A North American species.

Quércus Catesbæ̀i sempervìrens. An evergreen variety of *Q.* C. from seed here.

Quércus lancifòlia. A Mexican oak, approaching vìrens in habit. Evergreen. A distinct and beautiful species.

Quércus glàbra, apparently *Q.* imbricàta. Large laurel-like leaves. An elegant species, but tender hitherto, perhaps owing to the plants being very young.

Quércus heterophýlla. Nearly evergreen, like *Q.* vìrens, but not so hardy ; scarcely hardy, but very beautiful. New Orleans.

Quércus Ì*lex latifòlia* (perhaps crassifòlia would be better). Very thick and broad leaves. A distinct variety. The original tree in the Hammersmith Nursery.

Quércus. Ì*lex salicifòlia.* Original tree at Pishiobury, Sawbridgeworth. Very distinct and deserving of its name.

Quércus Ì*lex* l*aurifòlia.* Deep green, large foliage. Original tree at Pishiobury.

Quércus Ì*lex fagifòlia.* From H. S.

Quércus Ì*lex oblónga.* From H. S.

Quércus Ì*lex longifòlia.* From H. S.

Quércus Ì*lex rotundifòlia*, with very round dark green foliage. Selected from seedlings here.

Quércus Ì*lex integrifòlia* H. S.

Quércus coccífera glaúca. Very curious. Small round leaves, under surface glaucous ; deciduous. From Cels, Paris, 1840. Probably a hybrid between *Q.* pedunculàta and *Q.* coccífera.

*Quércus Fontanès*ii, Encyc. of Trees and Shrubs, p. 885. Subevergreen. H. S.

Quércus spicàta (rugòsa of some). A Mexican oak. with thick rugose evergreen foliage, half-hardy ; would probably thrive in Devonshire. Succeeds well grafted on *Q.* pedunculàta.

Quércus confertifòlia. Mexico. Evergreen.

Quércus petiolàris H. S.

Quércus callòsa H. S.

Fàgus *ferrugínea*, syn. F. americàna, *Encyc. of Trees and Shrubs*, p. 909.

Fàgus *castaneæfòlia.* Leaves scarcely to be distinguished from those of the Spanish chestnut.

Fàgus *castaneæfòlia hýbrida.* Apparently a hybrid between the above and the common beech.

Fàgus *sylvática purpùrea màjor.* A variety of the purple beech, with large leaves ; colour very dark. France.

Fàgus *sylvática argéntea*, the silver-striped common Beech. A distinct variety from France.

Fàgus *sylvática purpùrea péndula.* A fine pendulous variety of the purple beech. France.

Coníferæ Táxinæ.— Tá*xus microphýlla.* From Yorkshire. A pretty fastigiate variety of the common yew.

Coníferæ Cupré*ssinæ.—Taxòdium dístichum intermèdium.* An upright variety of T. chinénse.

J*uníperus commùnis péndula.* An elegant pendulous variety. Original tree at Pishiobury, Sawbridgeworth.

Juníperus commùnis hibérnica, the Irish Juniper. A beautiful fastigiate variety, distinct from the Swedish juniper, which is also fastigiate, and grows on soils unfavourable to the genus.

Juníperus virginiàna nàna. Original plant ten years old, and but 1 ft. high ; from seed here.

Juníperus virginiàna horizontàlis. Of remarkable horizontal growth ; from seed here.

Juníperus virginiàna péndula. A beautiful pendulous variety. Original tree at Parndon, Essex. A tree at Leveson Gower's, Esq., Clapham Common, approaches to this in habit.

Juníperus Oxýcedrus Encyc. of Trees and Shrubs, p. 1083.

Juníperus tetragòna H. S.

Juníperus bermudiàna, grafted on the red cedar.

Thùja filifórmis, grafted on *Thùja* orientàlis. The most remarkable of the *Cupréssinæ*, and not to be forgotten by any one who has ever seen the parent plant in the arboretum at Kew. Quite unique and quite hardy.

Thùja hýbrida. This has been in the nurseries of Mr. Pearson of Chilwell, Nottingham, for forty years, under the name of the Sweet-scented Arbor Vitæ, received also from France.

Coníferæ Abiétinæ.—*Pìnus Pináster Lemoni*ànus, *Encyc. of Trees and Shrubs*, p. 963. This variety is occasionally, in this nursery, selected from seedlings raised here of the pinaster.

A'bies excélsa nìgra. A large tree at Burleigh bears numerous cones, and forms a fine object.

Pícea Pinsàpo. A large stock of plants of this species, and also of *P.* cephalónica.

Pícea pectinàta stricta. Seedlings from a remarkable fastigiate tree near Beccles, Suffolk, retaining the habit of the parent, which was destroyed in 1839 by wind.

Perforated earthenware covers to seed-pans facilitate vegetation in seeds. Peat-earth seeds are raised in pans and boxes on the shady side of hedges and other screens, supported from the ground on boards to prevent the entrance of worms, and to facilitate protection in severe weather by mats suspended from the hedge, and reaching over the pots and pans on the shelf, like a cloak.

KENT.

Dartford Nursery ; J. D. Parks. — *Cýtisus alpìnus intermèdius.* Intermediate between the weeping and the common alpine or Scotch laburnum; a vigorous grower with a pendent habit; flowers deep yellow; racemes very long, sometimes 15 inches. A well-marked variety, deserving general cultivation. A new white and a new purple cineraria have been raised by Mr. Parks, which he has not yet "given out."

MIDDLESEX.

Horticultural Society's Garden. — Berberàceæ. — Bérberis *umbellàta* Wallich. Bot. Reg., 1842, Monthly Chron., No. 42. "A specimen of this new hardy shrub has flowered in the garden of W. Wells, Esq., of Redleaf, where it has been raised from Nepal seeds. It is something like B. aristàta, but has much narrower leaves, very decidedly glaucous underneath. From B. Coriària it differs in the same character, and in the flowers being much smaller, and in long-stalked clusters. The branches and spines are remarkably slender. The leaves are narrow, obovate, mucronate, slightly toothed, with very distant veins on a glaucous ground upon the under surface." (*Bot. Reg.*, 1842, *Monthly Chron.*, No. 42.) — *G. G.*

Leguminòsæ.—*Indigófera* Dósua *Dec.*, and *Don's Miller.* A straggling bush, a native of Nepal, with bright deep rose-coloured blossoms, highly ornamental. Raised in the Hort. Soc. Garden, where it flowered in May, 1840. "It appears to be a shrub sufficiently hardy to stand an ordinary winter in the open border, and growing vigorously in any good rich garden soil. It flowers freely during the months of July and August in the open border, but earlier if kept in the greenhouse. It is easily increased from cuttings of the young wood, treated in the ordinary way, or by seeds." (*Bot. Reg.*, 1842, t. 57.) — *G. G.*

A*maranthàceæ.* — *Deeríngia índica* Spr., syn. Celòsia baccàta *Retz.* — *G. Gordon. September* 17. 1842.

On walking through this garden on the 31st of December, we were much gratified by the state in which we found the following trees and shrubs: — Bigg's Everlasting Crab, laden with fruit, which remains on all the winter, a truly splendid sight; *H*ippóphae Rhamnoìdes fœ'mina, also covered with its orange-coloured berries, which change towards spring to a dark straw colour (there is a still more splendid specimen of this tree, covered with fruit, in the Abney Park Cemetery); Symphòria glomeràta, covered with its fine purple fruit, and forming a highly ornamental bush; Cotoneáster frígida and affìnis, both covered with fruit, but much less so in the Hort. Soc. Garden than in the Abney Park Cemetery; *E*læágnus argéntea (syn. Shephérd*ia* argéntea), *C*órnus màs, and *H*amamèlis virgínica, in full flower, the Glastonbury thorn coming into flower,

The Abney Park Cemetery at Stoke Newington contains 31 acres, and a named arboretum has been planted in it by Messrs. Loddiges, which contains every hardy tree and shrub, varieties as well as species, that was in their collection a year ago. The names are on brick, the same as in the Hackney arboretum, and they are unfortunately already scaling off; but there will be no great expense incurred in naming them on cast iron, or on wood with cast-iron shanks, as in the conservatory of the Hort. Soc. Garden.

The Fulham Nursery, Fulham; Messrs. Whitley and Osborn. — As usual, a number of new kinds have been added to the catalogue. Among these is a very curious variety of the common yew, with the leaves quite adpressed to the shoots. It was found in a bed of seedlings in the Chester Nursery by Messrs. Dickson, the proprietors of that establishment. The Dovaston variety of the common yew, of which a portrait is given in our *Arboretum Britannicum*, has also been added. There is a very handsome small plant of this variety in the Hort. Soc. Garden.

Exotic Nursery, King's Road, Chelsea; Joseph Knight. — The following names have been sent us, of the spelling of some of which we are doubtful, never having heard of them before.

A'bies, sp. from New Holland
*C*upréssus Moray Sombay
    sp. from Swan River
    Fothergílla
Cratæ'gus spicàta
*C*árpinus *B*étulùs variegàta
*E*uónymus angustifòlius
    nepalénsis
*F*ráxinus excélsior salicifòlia nòva
*F*àgus sylvática grandidentàta
        Crús-gálli
        latifòlia nàna
I'lex latifòlia
    crassifòlia
*J*ùglans règia laciniàta
        heterophýlla
*J*unìperus neoboriénsis
    religiòsa
Mahòn*ia* Knìght*ii*
*M*òrus nìgra cucullàta
*P*ỳrus *M*àlus maculàta
        sempervìrens
        flòre plèno
*P*æòn*ia* Mo*útan* arbòrea Newmàn*ii*
        *p*apaveràcea Jacquini*àna*
*P*ìnus, three new and distinct sp. from Alta California
    one new and distinct sp. from China
    one new and distinct sp. from New Zealand
*C*érasus *P*àdus *aucubæ*fòlia
        péndula
        variegàta
*P*tèlea trifoliàta variegàta
Paulówn*ia* imperiàlis
Quércus heterophýlla cucullàta
    elegantíssima
    macrophýlla
    glàbra
    nepalénsis
    Several apparently new kinds from mountains in the north-east of Portugal.
    Several new sps. from the Himalayas

Ribes péndulum
  *a*cerifòlium
*R*hámnus cucullàtus
*R*hús copallìna
*R*hododéndron pyramidàle
  Hartóppi
  òvum rubécula
  translùcens
  tortuifòlium
  cóncolor
  Chélsoni punctàtum
  revolùtum
*R*h. rubelàris
  ferrugíneum álbum
*S*àlix péndula nòva [? *S.* americàna péndula, p. 59.]
*T*ília argéntea péndula [? *T.* europæ'a péndula álba, p. 00.]
  macrophýlla [? p. 56.]
  mississippiénsis
*U'*lmus chinénsis
  pyramidàlis
  péndula nòva

NORFOLK.

Great Yarmouth Nursery; Youell and Co. — Araucària imbricàta in large quantities has stood within 500 or 600 yards of the sea, and fully exposed to the cutting winds from the north-east, for two years, without the slightest injury. — *Y. & Co.*

SOMERSETSHIRE.

Taunton Nursery; J. Young. — We visited this nursery on October 1. 1842, and found it very well laid out, with an excellent dwelling-house in the form of an old English cottage, built of solid blocks of stone, and thatched, combining every comfort expected in such a dwelling, and much of elegance and refinement. There is a veranda which has an excellent effect; and this, and also one of the living-rooms, open into a handsome conservatory. We do not recollect any nurseryman's house in England that can be placed on a par with this dwelling, except the house of Mr. Veitch, sen., in the Mount Radford Nursery, Exeter. Mr. Veitch and Mr. Young are unquestionably at the head of their profession, as far as commodious and tasteful dwellings are concerned. We could refer to one or two nurserymen's houses about London, for example, the late Mr. Wilmott's house at Lewisham, where there are commodious enough rooms within, perhaps as much so as those of the houses we have mentioned; but they form part of streets, or in some way or other are so circumstanced that they do not exhibit a single particle of taste without; houses, in short, that no man of taste would live in, if he could possibly help it. Along the walks in the Taunton Nursery there is a tolerable arboretum, exhibiting numerous fine specimens of the more rare trees and shrubs; and we were agreeably surprised to find the genus *C*ratæ'gus, with only one or two exceptions, correctly named. There are remarkably fine specimens of *C*ratæ'gus trilobàta and *C.* virgínica, covered with fruit. In a bed of seedlings of *Sophòra* japónica a plant has appeared with pendent shoots, exactly like the old *S.* japónica péndula; but we do not think it worth keeping distinct, any more than are the numerous plants of *Q*uércus pedunculàta heterophýlla, or *A'*cer *p*latanöìdes laciniàta, which frequently come up among seedlings of the species. There is an excellent stock of many articles, and particularly of *T*ília europæ'a álba péndula, the weeping Hungarian lime, budded on the top of stems 12 ft. high. This splendid variety of lime deserves to be far more frequent than it is on lawns among curious or odd trees. We saw a new yellow Portugal broom; a new and valuable hardy variety of Lonícer*a* sempervìrens serótina; and Lonícer*a* Góld*ii*, which Mr. Young considers distinct from L. occidentàlis; *A'*rbutus procèra budded on the common species in May last, and already producing shoots above a foot in length; Bignòn*ia* radìcans supérba, quite a bush; besides a number of other articles. In the lawn, which embraces the house on three sides, and contains some pretty pieces of rockwork, enclosing bright little basins of living water, there are many fine plants. We noticed particularly Bouvárd*ia* triphýlla spléndens, forming a bush 2½ ft. high; and a group of heaths, which Mr. Reed, the foreman, has planted out in a circular bed 5½ ft. in diameter, with the intention of keeping them there through the winter. Mr. Reed recommends the surface of the bed to be 2 or 3 inches below the level of the adjoining ground, which, he says, is a protection from the frost. He suggests the idea of a large wicker basket shaped like a beehive, the top to come off, with handles on the outside to lift both top and sides on and off at pleasure, and with a canvass cover to be put over the top during heavy rains. The species planted in this bed are as follows:—*E*rìca Hartnélli, *E.* assúrgens, *E.* echiiflòra, *E.* cerinthöìdes supérba, *E.* mirábilis, *E.* ventricòsa, *E.* incarnàta, *E.* pícta, *E.* intermèdia, *E.* linnæ*oìdes*, *E.* Wilmore*àna*, *E.* hýbrida, *E.* blánda, *E.* tróssula, *E.* Bowie*àna*, *E.* vérnix coccínea, *E.* cruénta, *E.* mammòsa, and *E.* verticillàta.

STAFFORDSHIRE.

Cliff Vale and Prospect Nurseries, near Leek; F. Fox.—Q*uércus pedunculàta aúrea.* A new gold-striped-leaved oak, raised last year from seed.

U'*lmus montàna críspa.* A new curled-leaved elm, raised last year.

F*àgus sylvática atro-rùbens.* A new variety of the purple beech; leaves more indented than those of the common purple, and the plant keeps its leaves in winter more like the common beech.

P*ỳrus aucupària aúrea.* A mountain ash with golden leaves, the stronger it grows the more golden the leaves appear; raised here some years ago.

S*piræ'a Fóx*ii. A dwarf shrub, growing from 1 to 1½ ft. high; free bloomer; colour white; raised from *S.* trilobàta impregnated by *S.* corymbòsa. Flowering in June and July; with the habit of corymbòsa, but a clear white, and a more compact and hardier plant.

T*áxus baccàta nàna.* Raised seventeen years ago from seed; and, at the present time, not more than 12 in. high.

T*áxus baccàta argéntea.* A new silver-striped yew, raised seven years ago from seed of the *T.* hibérnica; height, at the present time, 4 in.

I'*lex* A*quifòlium salicifòlium.* A new variety of holly, with very narrow leaves.

I'*lex* A*quifòlium serràtum.* Leaves deeply serrated.

*Azàlea póntica nàna álba Fóx*ii. A new white azalea, the dwarfest and best bloomer Mr. Fox has ever seen.

E*rìca* T*étralix aúrea.* Shoots of a golden yellow.

E*rìca vulgàris nàna Fóx*ii. A new dwarf heath; being much smaller than *E.* v. dumòsa.

Rìbes *nìgrum laciniàtum.* Leaves cut like those of the eagle's claw.

D*odecàtheon Meád*ia *pállida.* A new pale-flowered American cowslip; raised from seed of the white, with much of the habit of that variety.

A*nemòne horténsis.* Fifty varieties raised here from seed.

D*elphínium elàtum pállidum.* The palest-flowered variety which Mr. Fox has seen.

P*æ*ònia *officinàlis aúrea.* The common pæony, with yellow-blotched leaves. Specimen sent.

Tart Rhubarb. A new variety, raised from the red Tartarian, impregnated with *R.* palmàtum; large and vigorous. Leaves cut in the way of those of *R.* palmàtum.

Mr. Fox's printed catalogue exhibits a respectable collection of forest trees seedling and transplanted, fruit trees, ornamental trees and flowering shrubs, evergreens, climbers, &c.

SURREY.

Clapham Rise Nursery; Henry Groom.—*Mussendock.* A plant from the North of India; said to be used to repel the flies from the melons.

*E*chìtes Carrássa, Poinci*àna* règia, *Abùtilon* bedfordiénsis, Dasylírion filifórme, Francísc*ea* Lockhárt*ii*, Manétt*ia* spléndens, Bignòn*ia* speciòsa, Æschynánthus Horsfállii, Gésnera digitàlis, Zièria lævigàta, Clerodéndron laurifòlium.

Twelve varieties of hardy lilies, between *L*ílium atrosanguíneum and *L.* bulbíferum: rather dwarf, with very large umbels and beautiful rich-coloured flowers; some of them spotted and marked with a darker colour.

Agapánthus máximus. Fine blue, tall, with a very large head.

Euónymus *fimbriàtus.* This promises to be a first-rate evergreen shrub. I have not yet tried if it is hardy in this climate.

Euónymus *tíngens.* I have only one plant of this, therefore do not know much of it.

Tetranthèra japónica. A beautiful evergreen shrub; and, if hardy, will be a most desirable addition to the British arboretum.

Gaulthèria cordàta. This, I should think, is quite hardy.

Bérberis *sp.* From India.

New Cross Nursery; Cormack and Oliver. — *Cormack's Prince Albert Pea.* The earliest and best sort we have ever seen. A quantity was put into the ground on the 14th of March last, and the produce was fit for the table on the 25th of April following, being only forty-two days from the day of sowing to the date of gathering; and, we think, if it were sown about the present time (Nov. 14.) it would come in earlier in the season.

The British Queen Pea; syn. the St. Helier's Pea, *Lawson.* See Saunders's Nursery, under Jersey; and Lawson's Nursery, under Edinburghshire.

The Incomparable Cos Lettuce. Peculiarly crisp and juicy; perfectly hardy as a winter lettuce, not apt to run in summer, and requiring no tying. — *Cormack and Oliver. Nov.* 14. 1842.

The Deepdene, near Dorking; H. T. Hope, Esq., M. P. — An unnamed species of *A'*rbutus from Mexico flowered here and at other places last autumn, for the first time in England. — *J. B. Whiting. Jan.* 16. 1843.

WARWICKSHIRE.

Birmingham Botanic Garden. — *Coníferæ: Pines, Firs, &c.* — *P*ìnus Hartwègii, *P.* Pseùdo-*S*tròbus, *P.* Llave*àna*, *P. Teocòte*, and *A'*bies religiòsa, remained in the Birmingham Botanic Garden, in a rather unfavourable soil, uninjured, without the slightest protection. *P.* Devoni*àna* and *P.* Russelli*àna* perished more, I believe, from continued wet, and from being in a naturally springy soil, than from the severity of the winter. *C*upréssus thurífera stood well. — *D. Cameron. Oct.* 24. 1842.

Onagràceæ. — *Fúchsia macrostèmon díscolor* Lindl.; Hort. Brit., p. 636. This plant is a shy flowerer in pots, but it proves so hardy that none of its most tender shoots were injured last winter, while other species were killed back to near the surface. It flowered freely, and ripened plenty of seed. From the form of the berries, Mr. Cameron, of the Birmingham Botanic Garden, thinks it is entitled to be raised to the rank of a species. — *Idem.*

Ranunculàceæ Clematídeæ. — *Clématis Siebóldt*i and C. *azùrea grandiflòra* have stood the winter well, and the latter has ripened seeds. — *Idem.*

Stoneleigh Abbey, near Coventry. — *A new Pine-apple* raised from seed of the old Queen. The leaf is of a dark chocolate colour, the plant has the habit of the Queen, but the shape of the fruit resembles that of the Enville. Raised in March, 1834, and fruited in October, 1840. Likely to prove a valuable variety. — *John Brown, Gardener. Stoneleigh Abbey, Nov.* 16. 1842.

YORKSHIRE.

Hope Nursery, Leeming Lane, Bedale; W. May. — Quércus álba, nìgra, and rùbra do no good in this part of Yorkshire, either as useful or ornamental trees.

A'rbutus U'nedo var. *stricta.* A compact upright-growing plant, very different from anything Mr. May has seen. Raised from seed.

Cratæ'gus Oxyacántha var. Wýchnor (origin of the name unknown) is a puny-growing sort, but very distinct.

C. *Ox. heterophýlla* (where or when originated not known). A very beautiful variety, and a free grower.

Tília europæ'a whitleiénsis, the Whitley Hall (near Wakefield) variety of the common lime. This variety is much more graceful in its growth than the species; the branches stand out more horizontally. They are partly pendulous, and the internodes longer. I think it the most ornamental of all the tilias, most of which, when young, are dense and lumpish in their growth; but this variety is not.

I have found a very fine gold-blotched Ontario poplar, which, if the variegation is permanent, will, I think, be a very ornamental object.

Fuchsias. Many new hybrids of great merit.

May's new large late Red Victoria Currant. Berries very large, sometimes measuring upwards of 1¼ in. in circumference; bunches many of them 6 in. in length; the fruit of a beautiful scarlet, and the flavour excellent. Its foliage differs much from that of the ordinary red currant, being thicker, and not so much cut or pointed, and it hangs later on the plant in autumn, thus affording protection for the fruit to a later period without being matted or covered up.

Fuller's new hybrid Winter Radish. This is a great improvement on the old black Spanish radish, being a hybrid between that variety and the long scarlet, producing roots varying in colour from white and pink to black or purple: it is not so large as the black Spanish, consequently much finer in quality, and, for winter use, is a most desirable acquisition. It is perfectly hardy, so much so, that the person who raised it says he very frequently has the snow to brush off the ground to gather it, when it is at all times found perfectly sound and good. The best time for sowing it is from the first to the third week in August.

The Lapstone Potato. This is a seedling variety of "second early" kidney potato, raised between the early ash-top kidney and the Scotch red-nosed kidney; both much valued for their superior qualities. It was raised by a shoemaker in this neighbourhood, from seed, and hence the name Lapstone. It succeeds the early ash-top kidney, and is very productive, of very dwarf habit, of a good size and handsome oblong form, and of first-rate quality either for early or late use. It is the only really "second early" kidney I am acquainted with. It is not yet in circulation, but probably may be sent out towards spring in small parcels, of which due notice will be given through the usual medium.— *W. M.* [A few of these potatoes were sent to us; we found them full-eyed, very mealy, boiling soft, and of an excellent flavour. We think them a most valuable kind of potato.]

May's Victoria Swedish Turnip [of which we received very fine specimens] I consider as near perfection in shape and quality as it is possible to attain. I have been working with this Swedish turnip many years, and I consider I have attained the object I had in view, by producing a Swedish turnip perfectly globular, with small root and small top; and one which is not subject to run in the neck in the autumn, which is invariably the case with all other Swedish turnips that I know. The original stock from which this was raised was direct from Sweden, and was given me as being something extra. I sowed it in July, and produced fine turnips by November the same year; a very unusual thing: and I thought there was something peculiar in their form. I had then the whole, about fifty, planted for seed, and sowed the produce of the whole next season, and had a splendid crop; but I was surprised at finding a great diversity of colour and form in them, still all of them good specimens. They were visited by many leading agriculturists, and considered superior to any Swedish turnip then in cultivation. I saved the whole of these, selecting perhaps a dozen of the very best. The bulk of the seed was sold to good advantage, and is now known as May's Victoria; it is in great repute. The selected few I kept, and have been working with them two or three years; the specimens sent are a fair sample of the variety, which is planted for seed, and of which I shall have seed to offer, if all does well, next year.

The early White Nonsuch Turnip [of which fine specimens were also received] has undergone a similar process of care, and it is considered to be the very finest early white turnip known. It may be sown with the Dutch in spring, to which it is very much superior both in form and quality; and it is found very valuable to the market-gardener. I have supplied Mr. Charles Farnes, seedsman, St. John's Street, Smithfield, with it, who tells me he has had great praise of it from the market-gardeners who frequent Covent Garden Market.

May's Golden Globe Swede is the name which I shall give to the last improvement of the Swedish turnip when it is sent out. — *W. May. Nov.* 22. 1842.

Mr. May's Catalogue of select Plants occupies 20 pages of small type, and exhibits an astonishing assemblage of names, with the price to each. Stove plants, 100; *Cactàceæ*, 60; miscellaneous greenhouse plants, 360; camellias, 90; ericas, 70; geraniums, 110; fuchsias, 36; calceolarias, 60; cinerarias, 20; verbenas, 24; chrysanthemums, 50; select and showy hardy herbaceous plants, 620; hardy ferns, 11; new and superior kinds of heartsease, 100; carnations, 100; pinks, 60; auriculas, 90; select polyanthus, 20; roses, 440; ornamental trees and hardy shrubs, 620; Coníferæ, 68.

St. John's Nursery, Wakefield; Mr. Barratt. — *Fráxinus excélsior* var. aucubæ*fòlia* Barr. The leaves spotted like the aucuba, and very beautiful. Found by Mr. Barratt.

*Sàlix magnoli*æfòlia *Barr.* A seedling, with very large leaves. Raised by Mr. Barratt, but from what species is not mentioned.

Effect of terrestrial Heat on an Apple Tree. I have an apple tree, a late winter kind, Robin, which often reminds me of a theory of yours about heating the ground to improve the growth of trees. This tree stands where the sun is shaded from it until 3 o'clock, so that its situation cannot contribute to its early or fine growth; but there is a flue runs close by its roots, which causes it to vegetate and ripen its fruit three or four weeks earlier than any other kind, and it produces larger fruit than any of the same kind. I am quite persuaded, if the ground for fruit trees could be artificially warmed, we should secure earlier, better in quality, and more certain crops. — *W. B.*

Beverley Nursery; Laing and M'Intosh. — *Rhododendrons* raised from seeds sent from Mr. M'Intosh at Dalkeith Palace, quite different from *R.* arbòreum or *R.* cinnamòmeum; said to be of great variety of colour, habit, and character; and found at an altitude much greater than that where *R.* arbòreum is found, and hence more hardy.

The Hubshee Grape, of which *fig.* 10. represents a berry of the natural size, is esteemed the best dessert grape in the South of India. Plants will be ready to send out next spring.

Fráxinus sp.

Ròsa sp. A climbing plant.

Spirǽa sp. Said to be as fine as *S.* bélla.

Lobèlia sp. Very unlike any other species which we have seen, except one at the Glasgow Botanic Garden, which may possibly be the same.

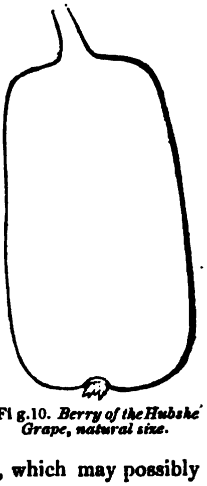

Fig. 10. *Berry of the Hubshé Grape, natural size.*

ISLAND OF JERSEY.

St. Helier's Nursery; Bernard Saunders. — *Le Feuvre's new Pea:* syn. British Queen Pea, *Cormack and Oliver*, p. 65.; St. Helier's Pea, *Peter Lawson and Son*, p. 68. This new and very superior variety of pea was raised by Ph. Le Feuvre, Esq., of this island, and, for its great produce and good qualities, deserves to be more generally known and more extensively cultivated. It is an improved variety of the shriveled marrow, resembling that of Knight's tall marrow; but it is considered by every one who has tasted it to be much superior to that esteemed variety. It grows from 5 ft. to 6 ft. high, and produces two, and often three, crops in succession from the same stalk. Its first crop is from the top, and it immediately throws out laterals, and produces another crop from the centre; after which it frequently shoots out from the bottom, and produces a third crop: thus continuing a supply for near two months. The pods contain from 7 to 9 peas in each; and, what is rather peculiar, when the pods become old and ready to dry, the peas still continue to boil green, and are well flavoured. It is particularly well adapted for late crops. Sown in June or July, it continues to produce till November, if not destroyed by frost before. I have this autumn supplied what I had to dispose of to Messrs. Cormack and Oliver, seedsmen, &c., New Cross, Surrey, and to Messrs. Peter Lawson and Son, seedsmen, No. 4. George Street Bridge, Edinburgh; from whom they may be procured.

Talavera Wheat. In January, 1842, about 52 lb. of Talavera wheat were sown in drills at 14 in. apart, after a crop of potatoes, in a plot of ground dug with the spade, and measuring exactly 77¼ perches. A small portion of lime ashes was deposited, and carefully raked into each drill. In May, lucern was drilled between each row of wheat, after hand-hoeing, which now exhibits a most luxuriant and flourishing crop. The precise produce from the above experiment has been 100 cabots and 18 lb. of remarkably fine wheat; and, as 90 Jersey perches are equal to an English acre, a similar produce from an acre would be 66 bushels and 32 lb., equal to 8 quarters 2½ bushels and 2 lb. The accuracy of this statement can be satisfactorily proved. — *B. Saunders.*

SCOTLAND. — EDINBURGHSHIRE.

Lawson's Nursery, Edinburgh; Peter Lawson and Son.—Onion of Nocera. The only really new culinary vegetable which we have introduced in course of the past season is the Onion of Nocera (Ognon de Nocera, p. 25. of the *Bon Jardinier* for 1842), seeds of which we received last spring; and these, being sown in a rich garden soil, produced a crop of ripened onions by the beginning of July, of a globular form, silvery white colour, and very small size, the largest being under an inch in diameter, which must render this a very desirable variety for pickling and other purposes for which small onions are used.

The *Pomeranian Cabbage* has not, we believe, been much grown as yet in the vicinity of London. We introduced it in 1837, and all who have grown it here agree in stating it to be the richest and most delicate autumn cabbage hitherto known; but, if grown on rich soil and allowed plenty of room, it gets too large, producing even a greater weight of head and leaves than the late drumhead cabbage. It is allied to the sugar loaf, but is so different from it that it may be reckoned to form a distinct class of cabbages.

The *St. Helier's Pea* (syn. Le Feuvre's new Pea, *Saunders;* the British Queen Pea, *Cormack and Oliver*) is a new wrinkled marrow we have had for two years past, from Mr. Bernard Saunders of Jersey, which attains a height of 6 to 8 feet, and yields a very heavy crop, of good quality, but inferior to Knight's pea in sweetness. It is, however, a decided favourite with all who have made trial of it in this country.

The *oblong Radishes* are a class, we believe, not generally known. They are of an oval form, or between the long and round rooted; and, three years since, we introduced from the Continent three varieties, viz. the red, scarlet, and white. The first of which is generally allowed to be fully superior to any of the common sorts, while the others are at least equal in quality to either the common, long, or turnip-rooted sorts.—*Lawson & Son.*

[We have received a copy of Messrs. Lawson's Horticultural Seed List, which is very copious, enumerating all the new kinds, as well as the old, of culinary vegetables.]

Roy's Nursery, Aberdeen; J. Roy.—*Araucària imbricàta* grows as well in this quarter as, if not better than, it does in England. I have seen a fair sprinkling of them over the country; about as many as there were of the larch about 100 years ago. I have plants that have stood out during the last ten winters without the slightest protection, and produced shoots from 4 in. to 9 in. long annually.

P*ìnus Lambert*iàna. I have had a parcel of cones from California, and succeeded in rearing a few plants; and also a number of deodar cedars, and Nepal species of *A*‘bies, *P*ícea, and *P*ìnus.

The following, after between seven and eight years' trial, I find quite hardy, *P*ìnus Larício calábrica, *P*. L. austrìaca, *P*. L. a. var. nígricans, *P*. L. taúrica, *P*. excélsa, insígnis, Lambert*iàna*, ponderòsa, rígida, Sabini*àna*, *Mùghus*, pumílio, *P*ináster, *P*ináster var. marítimus, Banks*iànà*, pyrenàica, *S*tròbus, *Cémbra*; *A*‘bies Douglàsii, Smith*iàna*, excélsa five or six varieties, álba, nìgra, nìgra grácilis, Menzièsii; *P*ícea nóbilis, Webb*iàna*, *Píndrow*, balsàmea, pectinàta. [In the above enumeration we have altered the names of some of the kinds from those given by Mr. Roy to those adopted in our *Encyclopædia of Trees and Shrubs*; separating, for example, *P*ícea from *A*‘bies. Mr. Roy mentions that he found a fine weeping variety of *A*‘bies excélsa at Newman's Nursery, Chichester, and in the collection at Stow.]

An *I*‘lex, a Cotoneáster, a *R*hús, and a *C*órnus from Nepal, will be noticed on another occasion.

A carrot with a violet-coloured root, and seeds heavy and nearly round like caraways, received from Nepal, has been tried, but is found to run very much to seed.—*J. R.*

IRELAND.

Glasnevin Botanic Garden, Dublin; D. Moore, Curator.—The following hardy trees and shrubs have been raised during the year 1842:—

Xanthóxylon hastìle. Nepal.

Céltis triándra Rox. Nepal.

Fráxinus floribúnda G. Don. *Encyclopædia of Trees and Shrubs*, p. 653 fig. 1270. Introduced in 1822, but lost during the severe winter of 1837–8.

Lonícera altàica Pall., syn. L. cærùlea *L. Encyclopædia of Trees and Shrubs*, p. 540. figs. 1005 and 1006. The seeds received from M. Otto of Berlin.

A *Lonícera* from Nepal, a *Fráxinus* or *O'rnus* from Cabul, and two beautiful evergreen shrubs apparently belonging to R*hamnàceæ*, have also been raised. These Brazilian shrubs have stood out during the last two winters without protection.—*D. M.*

Carton, the Seat of the Duke of Leinster.—There are a great many fine old specimens here, of which dimensions have been sent us, which we shall publish in a future Number. In the meantime we notice a cupressinous tree, which appears to be the cedar of Goa. It stands in what was once the nursery ground of a Mr. Smith, long since dead. It is 28 ft. high, the head 18 ft. in diameter, with a stem 2 ft. 6 in. in circumference at one foot from the ground, with long pendulous branches, which grow very gracefully, and hang down almost perpendicularly, like those of a weeping willow. Specimens have been sent us by Mr. Moore, curator of the Glasnevin Garden, and also by Mr. Alexander, the gardener at Carton, and we have shown them to different persons, most of whom think them the cedar of Goa, *C*upréssus lusitánica, *Arb. Brit.* and *Encyclopædia of Trees and Shrubs.*

Art. V. *Remarks on a Design for a Flower-Garden on Gravel, with Hints for the Grouping of Plants in Flower-Gardens.* By W. P. Ayres, Author of "Culture of Cucumbers in Pots," &c.

In the *Gardener's Magazine* for March last, p. 180, 181., you have inserted a design for a flower-garden on gravel, with a list of plants "with which it may be stocked the first year." Now, as I profess to have imbibed the principles of my taste in landscape and flower-gardening from the writings of yourself in the *Gardener's Magazine*, and in other of your excellent works; and as I find that I have either misapprehended your principles, or that you have not acted in accordance with them, in grouping the plants in the designs above adverted to, I take the liberty of offering a few remarks on what I consider errors in the arrangement; and I do this the more confidently, because I am sure that one whose whole life has been devoted to the furtherance of horticultural science will not take offence at his own performances being passed through the "crucible of investigation," especially when the investigator is a disciple of his own.

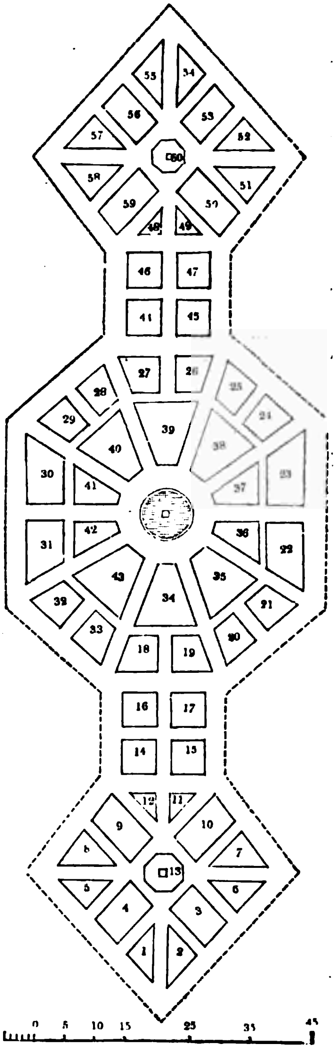

Fig. 11. *Garden on Gravel.*

Of the plan itself (and I must here request the reader to turn to it, or you to repeat it (see *fig.* 11.), though it is certainly not so pretty as the original one in the Volume for 1836, yet, retaining the boundary fence, I do not see that the space could have been much better disposed of, or any improvement made, unless it were to convert the four triangular beds, numbered 11, 12, 48, and 49, into two, as they are too small to group well with the other beds, and it is not indispensable that there should be a walk between them. Perhaps, also, the beds 18 and 19, and 26 and 27, would be as well made into two, as they would be more in proportion with the side beds 22, 23, 30, and 31, with which they should accord. The placing of the fence 2 in. within the gravel, in order to facilitate the cutting of the grass edging, is not good; because, as it will be impossible to roll within 2 or 3 inches of the fence, the walk will show a raw rough edge 5 or 6 inches wide, than which I do not know any thing that has a more untidy appearance. By care and attention this might be averted; but, where the mowing of the grass in the original plan formed an objection, it is doubtful whether there would be sufficient pains taken for that purpose. It is also objectionable, because, as the walk is only 4 ft. wide, two ladies cannot walk abreast without one of their dresses sweeping the fence; and because, by imparting a meagre and confined appearance, it militates so much against that boldness and ease so necessary in a principal walk. I should recommend it to be placed on the grass, and at least 18 in. from the walk, and if the horizontal wires are strained, and the lower one placed 1 in. above the grass, it will be easy, in mowing, to pass the point of the scythe under, so that there will be no loss of time.

In the choice of plants with which the garden may be stocked, you have been very unfortunate; not so much because some of them are worthless, as that you have introduced so many annuals, some of which are of such an ephemeral character, and others, as the Rhodánthe Manglès*ii*, of such doubtful culture in the open air, that I hold it to be impossible, without almost supernatural power, to keep the beds filled with flowers from June to October. It is true, that with unremitting attention a tolerable display may be kept up, but shabby indeed when compared with what would be produced by using verbenas, pelargoniums, petunias, &c. &c. What are the best of our annuals after a month or six weeks' flowering, even in the most favourable seasons; such, for instance, as clarkias, nemophilas, clintonias, godetias, collinsias, &c. &c.? Some of them will produce flowers for a longer period than above specified, and the beds may be replanted; but the flowers, after the principal bloom, will be small, and the plants look weedy; while the beds, if they are replanted, unless the plants are just coming into bloom, will have a very shabby appearance, in consequence of their not being sufficiently full of plants to group properly with the beds containing perennial plants. Depend upon it, the greater part of our most fashionable annuals, when self-sown, point out the time best suited for their growth and flowering; and, though they may flower when sown at a later period, the flowers are never so fine as they are in the early part of the season. The reason of this is, if the season is fine, the plants are incapable of supporting the excessive heat, while, on the contrary, if the season is wet, one small shower after they are in bloom dashes them all to pieces.

These remarks apply more particularly to the annuals above mentioned, and to nolanas, schizanthuses, clintonias, gilias, and others of the same fragile character. The most advantageous manner in which annuals can be used in beds is, planted in a single row as an edging to the borders. The centre of the beds may either be sown or planted to come in as the others go out of bloom, and thus a very respectable show may be kept up; but unquestionably the most effective combination, to secure a regular succession of flowers, is, bulbs and spring-flowering herbaceous and shrubby plants for the centres of the beds, autumn-sown annuals to succeed them round the sides, and half-hardy plants or late-sown annuals, which may be sown or planted after the bulbs have died down, or the other plants been removed to the reserve garden, for a summer display. In this way we have three distinct combinations of colour in the season; the beds are always covered; and, if half-hardy plants are turned out for the summer show, the row of annuals round the beds serves admirably to fill them, and produces a show of flowers until those last planted require the room. I cannot subscribe to the prevailing custom of planting verbenas and other half-hardy plants among annuals, to succeed them, because it has a very untidy, not to say slovenly, appearance; and the permanent plants have a miserable appearance, from being etiolated, for a long time after the annuals are removed.

In the grouping of the plants you have lost sight of a very important rule laid down by yourself, but where I cannot at this moment remember; viz., that "every bed in a symmetrical flower-garden, except the one which forms the centre, must have a corresponding bed, resembling it in colour, as well as in form and position." But, instead of this, you will see by referring to the plan, that of the two large beds, 34 and 39, instead of being of the same colour, one is stocked with Nemóphila insígnis, blue, and the other with Lobèl*ia* lùtea, yellow, well arranged, so far as complementary colour is concerned, but in direct violation of the old distich, which, slightly paraphrased, is one of the best rules we have in the grouping system, viz.: —

> "Group nods at group, each alley has a brother,
> And half the platform just reflects the other."

Again, in point of height, the two beds above-mentioned are planted with plants that will not exceed 6 or 9 inches in height, while the two smallest beds, 11 and 12, are filled with clarkias, which will grow to double that height. This is wrong; for I contend that, to secure unity of expression, it is quite as necessary that the height of the plant should be in proportion to the size of the beds, as that they should properly harmonise in regard to colour. Indeed, of the two evils, tall plants in small beds, and the reverse, is worse than an inharmonious amalgam of colours; because the mass of mankind cannot appreciate a scientific arrangement of colours, whereas an uncultivated eye will discover a want of harmony in the height of the plants.

For illustration, I will take the diamond-shaped group of beds numbered 1 to 13, and, assuming that the central bed 13 contains a rustic basket or vase, to form a side wing to the fountain in the central basin, which may be considered the axis of symmetry, I hold that, to form a harmonious whole, the large oblong square beds, 3, 4, 9, and 10, should be planted with plants that will grow to the height of 18 in., to support the vase or basket, while the small triangular beds should be stocked with plants that will not exceed 1 ft. in height. In this way the large beds are thrown up or rendered more intense, by the small beds acting as a shading to them, something on the same principle that a speck on a sheet of white paper is rendered more intense by being surrounded by a regularly shaded border of black: in truth, the large beds are the bold strokes in the picture, and the small ones the light and shade by which their boldness is rendered more apparent. I think it will not be denied that this group, thus arranged, would have a more imposing appearance than as it now is; therefore, before I conclude this article, I will endeavour to name the plants with which it may be grouped in accordance with these principles. An important advantage of this kind of management will be, it will tend much to simplify the grouping of plants: for, the beds being divided into classes according to their size, and the plants into classes according to their height, we should then have a certain number of plants for each class of beds; and the trouble of arranging would be nothing comparatively with what it now is, to select forty or fifty kinds from several hundreds without any classification. Where the garden is on grass and warm colours ought to prevail, a powerful effect might be produced by stocking the large beds principally with warm colours; and the reverse on gravel, where cold colours ought to preponderate. The proportion which the height of the plant ought to bear to the size of the bed is rather a difficult matter to determine, because small plants are admissible in large beds, though large plants cannot be tolerated in small ones; but, as a maximum guide, I think the plants ought not to exceed 6 in. in height in a bed of 18 in. wide; neither ought they to increase more than 6 in. for every foot which the beds increase in width afterwards. Much, however, will depend upon the size and form of the garden, the situation from which it is viewed, and the taste of the proprietor; but, whatever is the height fixed upon for the large beds, care must be taken that the plants in the smaller ones bear a just proportion to it.

To return to your arrangement again, you have in the beds from 34 to 38 inclusive five different shades of blue, without either yellow or orange to support them; and at the back of these, from 18 to 24, you have seven kinds of verbenas in succession, which has too much the character of a generic arrangement.

I could name other discrepancies, but perhaps placing the coarse Stenáctis speciòsa in 60, to correspond with *Œ*nothèra Drummónd*ii* in 13, is the greatest error. Stenáctis, in my opinion, is altogether unworthy of a bed; but, if it must have a bed, and have a "corresponding one," I should say "none but itself can be its parallel."

In conclusion, I may remark that the most certain mode of securing harmony in the grouping of a garden is, to make the arrangement during the time the plants are in flower, by placing the flowers on a sheet of green or yellow paper, as the garden may be on grass or gravel. In this way the most harmonious arrangement may be made; but, in the absence of flowers, pieces of card, of the form of the beds, and coloured to represent the flowers, will be found the best substitute.

Subjoined is a list of plants with which I propose to stock the garden. Some of them, as the ageratums, will probably require pegging down, to keep them to the proper height; but of that the superintendant of the garden will be the best judge.

1. *V*erbèna Hendersòn*ii*, purple.
2. Lobèl*ia* lùtea, yellow.
3. *S*álvia pàtens, with *S. c*hamædryoìdes, dark blue, round the sides; and Sanvitàl*ia* procúmbens, yellow, in the bottom, to cover the ground.
4. Bouvárd*ia* triphýlla, red scarlet.
5. Tournefórt*ia h*eliotropioìdes, pale blue.
6. *V*erbèna, the queen, white.
7. Campánula carpática, dark blue.
8. *V*erbèna amœ`na, pale lilac.
9. Same as No. 3.
10. Pentstèmon gent*ianoìdes* coccíneus, scarlet.
11. *V*erbèna purpùrea, purple.
12. *L*òtus jacobæ`us lùteus, yellow.
13. Díplacus glutinòsus, orange yellow, in the vase, with Lobèl*ia Æ*rìnus, blue, to droop over the sides; and *Œ*nothèra macrocárpa, pale yellow, in the bed.
14. *Petùnia* purpùrea, purple.
15. *V*erbèna Drummónd*ii*, pinkish lilac.
16. *H*eliotròpium peruviànum, violet.
17. Pelargònium compáctum, rose scarlet.
18. Pelargònium, basilisk, brilliant scarlet.
19. Calceolària rugòsa, yellow.
20. Lobèl*ia* ramòsa, dark blue.
21. Nierembérg*ia* filicaúlis, French white.
22. *V*erbèna Tweedie*àna* supérba, dark crimson.
23. *V*erbèna Neílli*i*, violet.
24. *V*erbèna Buíst*ii*, pale rose.
25. Pelargònium Manglès*ii*, variegated, white.
26. Pelargònium, Frogmore, scarlet.
27. Calceolària bícolor, yellow and whitish.
28. *A*nagállis cærùlea grandiflòra, dark blue.
29. Nierembérg*ia* calycìna, white.
30. *V*erbèna Tweedie*àna* latifòlia, crimson.
31. *Petùnia* erubéscens, blush.
32. *V*erbèna odoràta *r*òsea, pale pink.
33. Pelargònium, variegated ivy-leaved, white.
34. *A*gératum mexicànum, pale blue.

35. *Petùnia* hýbrida, purple.
36. *A*nagállis Monélli màjor, dark blue.
37. Lobèl*ia* bícolor, pale blue.
38. Pelargònium, Smith's emperor, scarlet.
39. *A*gératum grandiflòrum, pale blue.
40. *Petùnia* purpùrea, purple.
41. *A*nagállis Phillípsii, dark blue.
42. Lobèl*ia* grácilis, pale blue.
43. Pelargònium, Shrubland, scarlet.
44. Pelargònium compáctum, rose scarlet.
45. *H*eliotròpium corymbòsum, violet.
46. *V*erbèna *teucrioìdes*, white.
47. *Petùnia* hýbrida, purple.
48. Nierembérg*ia* intermèdia, purple.
49. Sanvitàl*ia* procúmbens, yellow.
50. *S*álvia pàtens, &c., same as No. 3.
51. Campánula Barrelièri, pale blue.
52. *V*erbèna multífida, pale pink.
53. Pentstèmon frutéscens, scarlet.
54. *V*erbèna Hendersòn*ii*, purple.
55. Calceolària integrifòlia, yellow.
56. Same as No. 3.
57. Campánula gargánica, blue.
58. *V*erbèna *teucrioìdes*, white and pink.
59. Bouvárd*ia* spléndens, scarlet.
60. Same as No. 13.

Chicksands Priory, Bedfordshire, Sept. 13. 1842.

[We agree with Mr. Ayres in almost every thing he has said in the above communication, and take much blame to ourselves for not having prepared with greater care the article which he so justly criticises. The truth is (though this is not a sufficient excuse), the list was got up by an assistant, on account of our extreme ill health at the time. We differ from Mr. Ayres, in thinking the retention of the small beds desirable, because, by contrast, they give effect to the large beds; and we prefer the wire framework on the gravel, rather than on the grass, because it is more architectural, that is, it rises out of an apparently more solid foundation. On referring to our Volume for 1836, p. 526., it will be found that the walk round the beds is not properly a main walk, and that, though wider than the cross walks, it is not intended for two persons walking abreast. — *Cond.*]

ART. VI. *On the Culture of the Garden Pea,* Pìsum *sativum.*

By JAMES DRUMMOND.

THE order Leguminòsæ, to which the *P*ìsum satìvum is allied, is large, beautiful, and very natural. The plants in this order are characterised by their pinnated leaves and papilionaceous flowers. Many of the trees and shrubs in this order are unrivalled in beauty; such as the following tribes: — *C*ýtisus, Robín*ia*, *C*olùtea, Amórpha, Wistàr*ia*, Glýcine, the beautiful coral tree Erythrìna, Cliánthus puníceus. The graceful trembling foliage and golden tufted flowers of the *A*càcia and Mimòsa radiate their charms even amidst the sandy burning deserts of Africa; or what can be more gay, on the sloping banks and rugged hill-sides of our own country, than the furze and broom, the *L*òtus corniculàtus, the *V*ícia *Crácca*, with its tufted peduncles of flowers of the gayest violet overtopping the hedges by the waysides, and several others of the same and of other tribes of the leguminous order, bespangling their banks? The moving plant, *H*edýsarum gýrans of Bengal, near the Ganges, is very wonderful on account of the voluntary motion of its leaves, which takes place without the least touch, irritation, or movement of the air. The meadows and pastures of Brazil, on account of the numberless plants of Mimòsa sensitìva and M. pudìca, assume a curious animated appearance, shrinking from the steps of the traveller. Some of the plants of this order are valuable timber trees, the wood being very hard, heavy, and of a beautiful yellowish green with dark brown streaks, such as the laburnum and Brazil wood of commerce. The leaves and pods of the *C*ássia *Sénna*, *C.* lanceolàta, *C.* emarginàta, and of *S*pártium púrgans, act as brisk purgatives; the juice of Coronílla vària as an emetic; the juicy pulp of *C*ássia fístula, *Tamaríndus* índica, and *C*eratònia *S*íliqua, as gentle laxatives, purging without the least pain; the decoction of the roots of Galèga virginiàna is considered by the Americans as a very powerful vermifuge; the green leaves of Orníthopus *s*corpiòides blister the skin; the seeds of *A'*rachis hypogæ'a contain a large portion of fixed oil; the seeds of Dípterix odoràta, or Tonquin-bean, is used for perfuming snuff; gum, balsam, resin, tannin, indigo, &c., are also produced from leguminous plants. Many of the seeds of this large and beautiful order are very farinaceous, and very nutritive, and compose a considerable portion of the food of man and of animals; such as *P*hasèolus vulgàris and *P*. multiflòrus, and their varieties; *D*ólichos *Catiáng* and *Sòja*, *L*áthyrus tuberòsus, *V*ícia *F*àba, and varieties; *P*ìsum arvénse and *P*. satìvum, the latter of which, with its numerous varieties, is the most common and useful of our culinary legumes.

The *P*ìsum satìvum is of great antiquity, its native country being unknown; but it is supposed to be the South of Europe. The varieties of the garden pea are very hardy, and not particularly adapted for forcing, but may be accelerated by sowing in pots, in boxes, on pieces of turf, drain-tiles, &c.; and placing them in a peach-house, glazed pit, or frame, and, when from 4 in. to 6 in. high, planting them out on a warm border along the south side of a wall, and protecting them with yew, spruce, or silver-fir branches, or covering with a pea-case, as described in M'Intosh's *Practical Gardener.* [Copied by our good friend Mr. M'Intosh, from our *Encyclopædia of Gardening,* 3d edit., p. 824., without the slightest acknowledgement, though the case was invented by us, and not previously described in any other work.]

I have practised the following method for at least twelve years, and find it far preferable to sowing in pots, boxes, turves, or drain-tiles. When I commence forcing the early peach-house here, which I do about the beginning of February, the border inside the house is covered on each side of the pathway to the depth of 3 or 4 inches with short dung (commonly cow-dung gathered from the park); over this are laid 2 or 3 inches of half-decomposed tree leaves, put through a very wide sieve, raking level, and beating it lightly with the back of the spade; upon this the peas are sprinkled as thick as they will lie, so as one seed may not lie above another, and covered with leaf mould 2 in. thick. In the course of three weeks or so, the peas are fit for planting out, being from 4 in. to 6 in. long. A border on the south aspect of a wall is chosen for the first planting; and, the ground being dunged, and digged deep and fine, the line is stretched in a diagonal across, or in a parallel direction to the wall along, the border, according to circumstances; a deep perpendicular cut is made along the line. The peas are then raised from the peach-house border with a three-pronged hand-fork, in large turves, and carried in a basket, barrow, or sieve, to the prepared drill. They are then divided with the hand into small patches, drawing each patch longitudinally, then placing it in the cut, in the manner of planting box-edgings, letting the roots hang as perpendicular as may be. By this operation, very little of the dung and leaf-mould falls from the roots. The earth is then pressed firm to the roots, and another drill planted in the same manner 9 in. from the former, thus forming a double row; the earth is drawn up about them with a draw hoe, and staked pretty closely.

I have been long in the practice of planting and sowing my peas in double rows, with the rows from 20 ft. to 30 ft. apart, and cropping between with dwarf vegetables; such as cabbages, cauliflowers, carrots, leeks, onions, turnips, scorzonera, salsify, &c. I find by experience that the peas pod far better, and are not so apt to mildew, when the rows are considerably detached; and they are excellent shelter for the dwarf vegetables between them; and also, that transplanted peas do not grow so tall, and are more productive than most that are not transplanted. This may be attributed to sowing in the leaf-mould, where a greater ramification of the roots takes place than in common mould; and in addition to this, in the act of transplanting, each of the main or tap roots becomes a *radix præmorsa*, and the consequence is, after being transplanted, a further multiplicity of the rootlets ensues. Peas sown in the peach-house on the 1st of February, and transplanted as described above, are fit for gathering about the same time as, or even sooner than, those of the same sort sown on the 11th of November preceding in the same situation. I gathered excellent race-horse peas on the 26th of May last which were sown the first week of February preceding in the peach-house, and transplanted as described above: this may be considered very early for the climate of Scotland, and this is none of the warmest corners of it.

By the accelerating and transplanting method there is a great saving of seed, especially if the spring months are wet and frosty; and it is more secure against the attacks of mice, pea-fowls, pigeons, and pheasants, the latter of which are among the most infernal depredators that ever entered the precincts of a garden. On making a large sowing of peas, and on passing them a morning or two afterwards, I have been mortified on seeing them ploughed up and masticated by these voracious depredators, notwithstanding the seed in the rows being closely covered with whin croppings. Since I adopted the above plan of germinating and transplanting my peas, my losses in seed have been comparatively trifling, as I make successive sowings of peas, beans, and French beans, till the middle of May, in the peach-houses, for transplanting, when, for two months after, I get the principal late crops of peas and beans sown in the open garden without much molestation, as the pigeons and pheasants commit their greatest ravages in the spring months, before they begin hatching their young.

To the gardener who has the superintendence of extensive vineries, peach-houses, flued pits, &c., the above method, coupled with that of a correspondent in the *Gardener's Chronicle* for 1842, p. 22., will, I presume, be a little interesting.

Germinating peas for transplanting, without either pots or boxes, in the manner I have described, is attended with less labour than one who has not practised it would imagine. The border of one of the peach-houses here will contain a sowing of two pecks: the extent of the borders on each side of the pathway is only 200 square feet. The following are the sorts of peas generally sown here, with the height of the straw; a sowing of which is made every fortnight from the 1st of February to the middle of July, sowing in the order they stand in the list, or nearly so.

	Height. ft. in.		Height. ft. in.
Early race-horse	2 0	Knight's tall marrow	6 0
Early Warwick	3 0	Matchless	6 0
Early frame	3 6	Magnum bonum	8 0
Charlton	4 0	Tall marrow	7 0
Groom's dwarf	1 6	Green marrow	5 0
Beadman's dwarf	1 6	Blue cimeter	4 0
White-podded	5 0	Large crooked sugar	5 0
Purple-podded	5 0		
Knight's dwarf marrow	4 0		
Woodford's green marrow	3 0		
Auvergne	4 0		

The two last sowings are
Early frame,
Early Warwick.

Blair-Drummond Gardens, Perthshire, near Stirling, Dec. 1842.

[The following is the article in the *Gardener's Chronicle* referred to by our correspondent.]

Peas in Pots.—I have found the following method very successful for having early peas ready by the 1st of May, and I think it may be advantageous for gardeners who have extensive vineries under their care. The peas are supposed to be ready for transplanting by the 1st of February; so that the same sowing does for the first out of doors as well as for those I am about to mention. The seedlings are removed from the boxes or pots where they have been thickly sown, when about 4 in. in height, and are planted thinly into large pots (twelves) which have been filled with good soil, not too rich. They are staked with moderately strong willows, and run round at distances of

6 in. with small twine, which has a neater appearance than, and does not shade so much as, common pea-sticks. The situation I have found quite suitable is at the back walls of the late vineries. The pots so filled and staked are placed on the top of the back flues, elevated to the glass as near as the stakes will permit; where they are to remain till the crop is gathered, which will be from the 1st to the 15th of May. It will readily be seen that the peas are certainly kept from the frost and severe weather, and have always plenty of air when the weather is fine. They are watered rather sparingly at first, but plentifully as they advance into bloom. The following is the result of two years' experience on the above method:—In 1839 and 40 I gathered a peck of peas on the 1st day of May; on the 11th of last May, above two pecks; and a peck on the 15th, 20th, and 25th days of the same month. The whole was gathered from pots standing on the back flues of two vineries, each 40 ft. in length. I have tried the early frame pea, the Warwick, and Thompson's early dwarf; but I have found very little difference as to earliness or produce. I have tried to force peas in pits and various ways, and have found that they will not bear forcing till they are out of bloom, and the pod set; then they will bear it, and be forwarded admirably. I have tried them in the autumn on the same principle, but could not get them after the 20th of November.—*N. Wilson. Gopsall.*

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

ICONES Plantarum rariorum Horti Regii Botanici Berolinensis. By Link, Klotzsch, and Otto. Nos. IV. V. and VI. 4to, from p. 49. to p. 94. inclusive. Berlin, 1841 and 1842.

The plants figured are: tab. 19. Pentapèra sícula *Kl.*; *Æ*rìca sícula *Cus.* *Æ*ricàceæ. Sicily.—20. Tigrídia violàcea *Schiede*, *I*rídeæ. Mexico.—21. Olín*ia* acuminàta *Kl.* Olín*eæ*. C. G. H.—22. Pròte*a* longiflòra *Lam.* var. Múndii, Prote*àceæ*. C. G. H.—23. Higgíns*ia* mexicàna *Lk. et Otto*, *R*ubiàceæ. Mexico.—24. Olín*ia* cymòsa *Thunberg*, Olín*eæ*. C. G. H.—25. Pitcaírn*ia* ríngens *Lk. et Otto*, Bromel*iàceæ*. South America.—26. Linnæ`*a* robini*oìdes* Lk. et Otto, Leguminòsæ Papilionàceæ *L*òteæ. Mexico. A very handsome shrub with pink flowers, and probably hardy.—27. Echevèr*ia* bracteolàta *Lk. et Otto*, Crassulàceæ. South America.—28. *S*álvia tubifórmis *Lk. et Otto*, Labiàtæ. South America. Suffruticose with scarlet flowers.—29. *O'*xalis díscolor *Kl.*, *O*xalídeæ. Chili, Brazil, &c. Flowers dark and pale pink, and the leaves dark pink beneath.—30. Commelìn*a* scàbra *Benth.*, Commelín*eæ*. A perennial from Mexico.—31. Scelochìlus Ottò*nis* Kl., *O*rchídeæ. Caraccas.—32. *H*ibíscus Cameròn*is* Knowles et Westcott, *M*alvàceæ. Raised by Mr. Cameron of the Birmingham Botanic Garden, from Madagascar seeds.—33. Lobèl*ia* texénsis *Rafin.*, Lobel*iàceæ*. Texas. Flowers deep scarlet.—34. Tigrídia lùtea *Lk. et O.*, *I*rídeæ. Chiloë. Readily propagated either by bulbs or seeds.—35. Lycopérsicum peruviànum *Miller* var. commutàtum *Spr.*, *S*olanàceæ. South America. Flowers yellow, and larger than those of any other species.—36. Epidéndrum (Osmóphytum) marginàtum *Lk. et O.*, *O*rchídeæ. Caraccas, in woods.—37. Schistocárpha bícolor *Lessing*, Compósitæ. Mexico. The plate of this species will appear in Part VII.

The figures are executed with the very greatest care, and evidently faithful representations of nature; and the letterpress is copious, scientific, and also popular. Under every species the generic character, and what belongs to the genus generally, are stated; next the section of the genus to which the species belongs is described; then the specific character; next the synonymes, and references to authors and to plates; affinity of the species; affinity of the genus; the culture of the species; and, lastly, a detailed description of the plate. A translation of the work, with the same plates, would be very instructive to the English amateur; but it would not answer, as is evident from the failure of Maund's *Botanist*, which was conducted very much on the same plan, though not with the same care and knowledge of the subject, and was cheaper than any other botanical periodical.

Abbildung und Beschreibung blühender Cacteen, &c. Figures and Descriptions of Cacti in Flower, &c. By Dr. L. Pfeiffer and Fr. Otto. Parts III. IV. and V. Cassel and Leipzig.

We noticed the first appearance of this work in our Volume for 1839, p. 522., to which we refer for the essence of the prospectus, and for the high opinion which we have expressed of the letterpress and engravings. Part II. we have never received. The parts before us contain:—

Tab. 11. Cèreus Curtísii Lk. et O., C. Royèni Bot. Mag. t. 3125., C. octagònus *Hort.* A native of New Granada.—12. Cèreus flagrifórmis *Zucc.* Mexico. At first this species was thought to be a variety of C. flagellifórmis, but when it came into flower M. Zuccarini gave it the name of flagrifórmis, which, though a different word, has the same meaning as flagellifórmis (whip-shaped).—13. Mammillària uberifórmis *Zucc.* Mexico.—14. Echinocáctus leucocántha *Zucc.* Mexico.—15. Cèreus coccíneus *Salm.*, C. bìfrons *Haworth*, *Suppl.* p. 76. Mexico.—16. Cèreus setàceus *Salm.*, *Dec. Prod.* iii. p. 469. Brazil.—17. Rhípsalis pentáptera *Pfeiff.* and R. platycárpa *Pfeiff.*, syn. Epiphýllum platycárpum *Zucc.*; and Cèreus platycárpus *Zucc.* Brazil.—18. *Opúntia* foliòsa *Salm.*, *Dec. Prod.* iii. p. 471., *Cáctus* foliòsa *Willd.*, *C.* pusílla *Haw.*, *Opúntia* pusílla *Haw.* South America.—19. Mammillària uncinàta *Zucc.*, M. adúnca *Sheid.* Mexico.—20. Echinocáctus acutíssima *Lk. et O.*, Mammillària floribúnda *Hook. Bot. Mag.* t. 3647. Chili.—21. Echinocáctus hybocéntra *Lehm.*, E. mammillariöìdes *Hook. Bot. Mag.* t. 3558. Brazil.—22. Cèreus erióphorus *Lk. et O.*, C. cubénsis *Karw. et Zucc.* Cuba.—23. Cèreus undàtus *Lk. et O.* Native country unknown.—24. *Opúntia* cochinillífera *Mill. Dict.* ed. 8. No. 6., *Cáctus* cochinillífera *L.*, *C.* campechiàna *Dict. Natur.* vi. p. 203. South America.—25. Mammillària eriacántha *Lk. et O.*, M. cylindràcea *Dec.* Mexico.

This is a splendid work, every plate being as carefully finished and coloured as if it were an original drawing. It will be hailed with delight by the collectors of *Cácti* in both hemispheres; not only for the beauty and fidelity of the representations of their favourite plants, but on account of the number of new species which it portrays.

Sowerby's small Edition of English Botany. In 8vo numbers, every alternate Saturday.

This most excellent work is drawing rapidly to a close; Nos. 429. and 430. containing plates of lichens. We have so often recommended Sowerby's *Botany* to all persons of leisure living in the country, and to all gardeners who can afford it, that we can only repeat our previous recommendations. In every garden there ought to be a garden library, the property of the proprietor, and this is one of the books that it ought to contain. Young ladies living in the country will find it a source of perpetual interest. At this season, for instance, though there are almost no flowering plants in a growing state, yet there are numerous mosses and lichens which are growing vigorously; and a number of evergreen ferns at the roots of hedges, and on pollard and other trees, that they would find the names of, by gathering a specimen, bringing it home, and turning over the leaves of Mr. Sowerby's book.

Baxter's British Flowering Plants. In monthly numbers, 8vo, plain and coloured.

This is a work of the same nature as Mr. Sowerby's; but, while the latter contains engravings and descriptions of all the species, Mr. Baxter's work is confined to figures and descriptions of the genera, with a bare enumeration of the species. The engravings are also larger and more elaborate in regard to detail, as are also the descriptions. To those who cannot afford Mr. Sowerby's work, Mr. Baxter's will prove an excellent substitute: 125 Nos. have been already published, and three more will complete the work, in six handsome volumes. It is unquestionably the best work of the kind that has yet appeared.

Die Coniferen. By Francis Antoine. Parts IV. and V. 1841.

We noticed Parts II. and III. of this valuable work in our Vol. for 1841, p. 624., and the parts before us are not less excellent than those which have preceded them. The last species described is No. 65. tab. 24. fig. 2. *Picea Pindrow.* One of the plates in Part V. exhibits a group of cedars on Mount Lebanon, engraved from a sketch by a French artist, and kindly supplied by Baron Hügel. The trunk of one of the cedars in this group, M. Antoine informs us, measures 46 ft. in circumference.

Prince's Annual Catalogue for 1841 *and* 1842, *of Fruit and Ornamental Trees and Plants, cultivated and for Sale at the Linnæan Botanic Garden and Nurseries, Flushing, Long Island, near New York.* 32d edition.

As we are collecting American oaks for our own private arboretum, we were surprised, on looking into this catalogue, to find only eight American species named ; with the addition, however, of the words " 20 other species." We should be glad to have plants of the whole twenty-eight species; and, if they prove distinct species, we shall pay the catalogue price for them, but not otherwise.

A Catalogue of the Fruits cultivated in the Garden of the Horticultural Society of London. Third edition. 8vo, pp. 182. London, 1842.

Too much cannot be said in praise of this book, which is perhaps one of the best things of the kind in existence. We do not know a single individual who combines a scientific knowledge of gardening generally, with practical skill in fruits, to the same extect as Mr. Thompson ; and, as a man, he has a heart as good as his head ; both are cultivated; while it too often happens that the former is neglected. In our opinion, Mr. Thompson is a model for young gardeners to form themselves upon.

The Book of the Farm. By Henry Stephens, Editor of the Quarterly Journal of Agriculture. Parts IX. and X. Edinburgh and London, 1842, 1843.

These parts maintain the high reputation which the work has obtained. The last subject treated of is the threshing-machine and the threshing of corn ; both brought to great perfection in Scotland.

The Three Prize Essays on Agriculture and the Corn Law, published by the National Anti-Corn-Law League. Pamph. 8vo, pp. 50. Price 4*d.* the three. Manchester and London, 1842.

The essay which gained the first prize is by George Hope, tenant-farmer in East Lothian; the second was gained by Arthur Morse of Swaffham in Norfolk; and the third by W. R. Greg of Caton, Lancaster. The essays are well reasoned, and deserve the careful perusal of all who take an interest in the subject of them.

The Builder; a Builder's Newspaper and Magazine. In weekly folio numbers.

This journal is intended to be, for the various arts connected with building, what the gardening newspapers are for gardening. The first number promises well. It contains, besides an address, what the editor calls his " Sermon," an article on the Treatment of Workpeople by their Employers, written in an excellent spirit; several reviews, miscellaneous paragraphs, and various notices, together occupying five pages, with the addition of eleven pages of advertisements; in all, sixteen folio pages for 1½*d.*, or stamped to go free by post 2½*d.*! The work is every way deserving of success, and we doubt not will obtain it.

Animal Chemistry, or Organic Chemistry, in its Applications to Physiology and Pathology. By Justus Liebig, M.D., Ph.D., F.R.S., M.R.I.A., Professor of Chemistry in the University of Giessen. Edited, from the Author's Manuscript, by William Gregory, M.D., F.R.S.E., &c. 8vo, pp. 354. London, 1842.

There is much in this work to interest the thinking gardener, who, if he can procure the book, will find his mind enlarged by the perusal. It will probably be noticed more at length in an article which Mr. Lymburn is now kindly preparing for us.

Van Voorst's Naturalist's Pocket Almanack for 1843. London. pp. 32. 1*s.*

Mr. Van Voorst is the publisher of a number of works on natural history, such as Yarrell's *Birds*, Yarrell's *Fishes*, Bell's *Quadrupeds*, Jones's *Animal Kingdom*, and twenty or thirty others, which have contributed greatly to the diffusion and popularity of natural science, and elevated Mr. Van Voorst's name to the first rank among liberal and enlightened publishers. His books are all admirably got up, and very cheap. The little book now before us is original in its plan; the whole of the information which it contains being limited to natural history. At the end there is an account of the different Natural History Societies in London, including the Royal, Linnæan, Horticultural, Geological, Zoological, Entomological, Botanical, Microscopical, and Ornithological. Next follows an account of the metropolitan museums, libraries, and gardens. For every leaf of letter-press there is a leaf of blank paper, ruled with blue lines at the rate of eight to an inch.

The Farmer's Calendar and Diary of Agriculture and Gardening for the Year 1843. London: printed for the Company of Stationers. 12mo, pp. 95. Price 1*s.*

The agricultural calendar is by a friend of ours, of the Scotch school, who has the management of three extensive farms in Wales, and we can recommend it as one of the best things of the kind. The other parts of the *Farmer's Calendar* are good and useful, and the work may be considered as among the best of the rural almanacks.

The Literary and Scientific Register and Almanack for 1843. By J. W. G. Gutch, M.R.C.S.L. London. pp. 187.

Besides an almanack, and a number of ruled blank pages for memorandums, there are a great number of useful facts on almost every subject connected with literature, science, and every-day life; and the price, bound, is only 3*s.* 6*d.*

The British Almanack of the Society for the Diffusion of useful Knowledge for 1843. Small 8vo, pp. 96. London, 1843. 1*s.*

Companion to the Almanack, or Year-Book of General Information for 1843. Small 8vo, pp. 260, several woodcuts. London, 1843. 2*s.* 6*d.*

The first article in the *Companion* is on the recent applications of electricity to the arts: it treats of lightning conductors, copper sheathing, submarine operations, electric moving power (in lieu of steam, &c.), electro-locomotive power, electrical telegraph, electro-metallurgy, electro-gilding and plating, electrotype, and electrotint. Such are the wonders of electricity! Passing over a number of articles, we come to Art. xv., Public Improvements, in which the new churches and other public buildings erected throughout the country are noticed, and beautiful engravings given of Wilton Church, near Salisbury, in the Lombardic style, Messrs. Wyatt and Brandon, architects, a strikingly original edifice; Christ church, Broadway, Westminster, in the latter period of early English, Ambrose Poynter, architect; Wesleyan Theological Institution, Richmond, A. Trimen, architect; Cambridge County Courts, in the Palladian style, Messrs. Wyatt and Brandon, architects; and Brunswick Buildings, Liverpool, A. and G. Williams, architects, a building in the Italian Palazzo style, intended to be let out as offices to different occupiers. As heretofore, we strongly recommend the *Companion* to every gardener who can afford it.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Use of Sulphate of Ammonia in Agriculture. — For the full developement of the capacity of the soil, and to afford a greater amount of nitrogen than what is afforded either by the ordinary manures, or the ammonia, &c., of the atmosphere, sulphate of ammonia has been introduced, and found to be a most valuable auxiliary, as a top dressing, to the farmer. It has been found to impart a greater degree of fructification to grass, wheat, and other grain, than any other dressing yet discovered, and at a less cost by 50 per cent.

The mode of application, as adopted by Mr. C. Hall, of Havering-atte-Bower, Essex, is as follows: —

Having selected several fields of grass, peas, turnips, and wheat, he had sown broadcast on parts of these fields in quantities, at the cost of 5*s.* 3*d.*, 11*s.* 4*d.*, and 21*s.* per acre; the sulphate having cost him 17*s.* per cwt.

The produce was kept and threshed separately, when the increase from the wheat-land was found to be as follows: —

The part that was sown at the rate of 5*s.* 3*d.* per acre gave an increase of three bushels; 11*s.* 4*d.* gave six bushels; and 21*s.* upwards of nine bushels; besides a considerable increase of straw. (*Phil. Mag.* for December, 1842, p. 489.)

Agricultural Implements. — The improvements which are constantly making in agricultural implements are still greater than those which are taking place in the culture of corn and green crops. The Scotch swing plough is no longer considered the best implement of the kind, but one has been found requiring considerably less draught. For measuring the power required to draw any implement, we have Cottam's Draught-Gauge, allowed by Mr. Pusey to be the best machine of the kind. We have also Cottam's Grubber, which is a great improvement on Finlayson's Harrow; Cottam's Revolving Dibble, for dibbling wheat or beans; Cottam's One-Row Drill, for manure and seed; and Cottam's Apparatus for hatching and rearing Game and Poultry. But, perhaps, the most remarkable agricultural machine of the present time is one imported from France, and to be seen in operation on the premises of Messrs. Graham and Co., Malin's Wharf, Fore Street, Lambeth, which completely cleanses damaged wheat, and also renders wheat that has been injured by the weevil, not only perfectly free from that insect, but weevil-proof for the future. The process would be too tedious to describe here; but it is completely effective, and of immense importance with reference to the preservation of corn in granaries. Whoever wishes to know all that is newest and best respecting agricultural implements and machines cannot do better than consult Messrs. Cottam and Hallen of London, or Messrs. Slight and Co., Edinburgh.

The oropholithe (*orophē*, a roof, and *lithos*, a stone), a composition used as a substitute for zinc, lead, tile, or slate, and apparently well adapted for covering garden and agricultural buildings, is now attracting a good deal of attention among architects. It appears to be a peculiarly hard cement, spread thinly over a surface of canvass, which may be cut up into squares of any convenient size. "The oropholithe, as applied to buildings, will be found to recommend itself to attention by its cheapness and durability, as well as by the absence of all qualities capable of attracting electric matter, and which are more or less resident in all metallic substances. This cannot fail to render it safer than either of the metals now used on the tops of houses; while, not being liable to oxidation, and entirely impenetrable to water, it must, on both these accounts, recommend itself to the attention of builders with additional force. Independently of its durable qualities, for cheapness the oropholithe will be found unrivalled. It can be laid down at about half the price of zinc, at one quarter of that of lead, and, from the immense saving in the expenditure of time and money, at considerably less than slates and tiles. Then, its weight being so much less than that of any of these materials, the saving of timber in rafters will not be the least important consideration with the architect; as, while the new-invented material effectually resists the action of the elements, when the amount of pressure taken from the roof is considered, the whole under-structure may be much lighter. The oropholithe being laid down on large surfaces, and its joints united by the cement of which it is made, the whole superfice of the roof appears covered with one solid sheet of the material; and this compactness gives it such an extraordinary power of resistance that no wind storm, how violent soever, could by any possibility remove it, while the building itself continued firm in its position. As a medium preventive of damp, as fatally injurious to buildings as to the health of their inhabitants, the oropholithe is likely to supersede the custom of stuccoing walls as at present. Lined with oropholithe, the rooms will be instantaneously fit for habitation, free from damp, and the tainted reek so disagreeable in newly built and unseasoned houses; that is to say, for this purpose one side is covered with the material which is placed against the wall, the other, or exterior side, presents a dry surface which may be papered immediately. The resistive qualities of the oropholithe are so great, that after years of exposure to the action of those universal solvents, air and water, no visible alteration in its structure has taken place. Hence its applicability in lining baths, tanks, cisterns, fishponds, &c., becomes manifest." Such are the uses of this article, as stated in the prospectus. — *Cond.*

Wirework is now being applied to a great many purposes in gardening, and to some in agriculture, and we expect shortly to be able to announce a mode of coating over wire with zinc by the galvanic process, which, without adding much to its expense, will add greatly to its durability. We have lately found, in various parts of the country, that a strained wire fence 4 ft. high can be put up cheaper, all expenses included, than a wooden fence of the same height, even without reckoning any thing for the wood. Land-owners, who have plenty of young larches and Scotch pines that might be used in making such fences, find that the labour of cutting down the trees and forming them into fences is more than the entire cost of the strained wire fence. Almost every ironmonger deals in such articles. We have before us a great many designs, by Mr. Porter of Thames Street, and Messrs. Cottam and Hallen of Winsley Street, London; Messrs. Young of High Street, Edinburgh; and Mr. Samuel Taylor of Stoke Ferry, Norfolk. Mr. Taylor confines himself to the manufacture of a cheap and effective fence against hares and rabbits, which is, at the same time, an excellent substitute for hurdles or cords, as sheep-folds, and for sticks for peas, trailers in general, and other garden purposes. Mr. Porter exhibits a great variety of designs for fences and useful ornamental objects, as do Messrs. Cottam and Hallen; and very handsome designs, with very low prices affixed, are to be had of Messrs. Young of Edinburgh. A correspondent in Scotland, on whom we can rely, says of Messrs. Young: "They are young men who have carried into their business the scientific knowledge of the age, acquired at our cheap and greatly improved educational institutions. They are intelligent, tasteful, enthusiastic, and of a good address, and they are being very extensively employed. Sunk fences are now seldom made in Scotland, though I see you occasionally recommend them in England. A wire fence 3 ft. 6 in. high is sufficient for cattle and sheep. It consists of six horizontal wires passed through, or fastened on, wooden posts, and is put up for 9*d.* per yard; and with an additional wire, to render the fence 4 ft. 6 in. high, for 10*d.* per yard; the posts being supplied and fixed in the ground by the proprietor. These posts, if tarred and charred, are found to last 20 years. The wires are generally painted with gas tar. Instead of running the wires through the wooden posts, it is found an improvement to attach them by iron staples; which admits of renewing a post when it decays, without disturbing any of the others. Very strong deer fences Messrs. Young erect at from 2*s.* to 3*s.* 6*d.* per yard, according to the height; the proprietor providing stones for the straining pillars, and stone or wood blocks for the intermediate uprights, &c. Curved wire fences [which are so beautifully put up by Mr. Porter, with under-ground stays, and no prop or brace of any kind shown above ground] are also put up by Messrs. Young."—*W. D. S. Sept.* 28. 1842.

Gregson's Green-Flesh Melon is a small fruit, seldom weighing more than three pounds, but it is decidedly the best-flavoured Cantaloup melon that I have ever tasted. The person from whom I had the fruit has grown it for many years, and never had any other variety that gave so much satisfaction. He does not know its origin.—*J. B.* [We have a few seeds of this melon at the service of any one who chooses to ask for them, enclosing a postage stamp.]

ART. II. *Foreign Notices.*

ITALY.

U'LMUS *fúlva.*—I was much surprised to read (Vol. for 1840, p. 231.) of the medical properties of the *U'*lmus fúlva, owing to the great quantity of mucilage with which its cellular tissue abounds; and as the mucilage is very nutritious, and as the leaves and bark of the common elm fatten cattle in a short time, on account of the portion of mucilage which they also contain, we may hence conclude that cattle would fatten much more quickly if fed with the leaves of the *U'*lmus fúlva. In the *Maison Rustique du XIX Siècle* it is said that the leaves of the *P*ópulus canadénsis in a green state are equivalent to the same weight of the best hay: what is meant is, that a certain weight of these leaves in a dry state nourish or fatten equal to twice (due) the weight of the best hay. A comparison of the nutritive properties of the leaves of the Canadian poplar, the common elm, and the *U'*lmus fúlva, is well deserving of a trial.—*Giuseppe Manetti. Monza, Nov.* 1. 1842.

Nelúmbium *tibetiánum.*— At the house of my friend George Compton, Esq., to whom Lombardy is indebted for many fine and rare plants, and who lives in the neighbourhood of Como, I saw *Nelúmbium* tibetiánum in full flower in August last year (when it flowered for the first time), as well as in the same month of the present year, and which I do not think has been as yet described. He grows it in a pot 2 ft. in diameter, and 1½ ft. high, filled with mould to the height of 1 ft., in which the nelumbium is planted, and from this point to the top it is kept filled with water. The flowers are rather smaller, more round (see the two figures sent), and of a darker colour than those of the *Nelúmbium* speciósum. There is no difference in the leaves and smell of the flowers from the other species; therefore I consider it a variety. In the summer he keeps it exposed to the sun in the open air, and in winter he protects it in a greenhouse. — *Idem.*

[We have sent the figures of the two nelumbiums to Sir William J. Hooker, who sometimes publishes in the *Botanical Magazine* specimens of interesting plants, though they may not have been introduced.]

NORTH AMERICA.

The Philadelphia Horticultural Society held their fourteenth exhibition on the 13th instant, and it will close this evening. It is more tasteful than any previous one, while the usual proportion of plants and fruits is maintained. I send you two newspapers containing accounts of particulars. There are upwards of 300 varieties of the genus Cáctus; of rare plants there are Urània speciòsa from R. S. Field, Esq. of New Jersey; palms of several kinds from Mr. J. B. Smith; the pitcher plant, and the butterfly plant, from Mr. R. Buist; *Pandànus* ùtilis and two species of Zàmia from G. Pepper, Esq. V. P. of the Society; *A*ristolòchia sìpho from General R. Patterson; mango trees, croton, calabash tree, coffee tree, and indigo tree, from Mr. Peter Mackenzie. The fruits were superb. Apples and peaches of great size, and beautiful; seckle pears in great perfection; large blue and yellow plums. The grapes also, foreign and domestic, were very large. I refer to the printed list. — *J. M. Philadelphia, Sept.* 23. 1842.

Doryánthes excélsa. — The majestic Doryánthes excélsa has been exhibited in Philadelphia for the last twelve days, by Mr. Sherwood, florist. The stem began to shoot in December last, and is now (June 18. 1842) about 12 ft. high. Eleven flowers have blown, and eighteen more are to come out. It is at present in the beautiful greenhouse of Mr. Pepper, to which it was removed after the exhibition of it ceased. I have not been able to see Mr. Sherwood to know the history of this specimen of the plant. — *J. M. Philadelphia, June* 18. 1842.

ART. III. *Domestic Notices.*

ENGLAND.

WORMLEYBURY, in Hertfordshire, formerly the seat of the late Sir Abraham Hume, Bart, and now in possession of —— Cust, Esq., has been till lately in a state of deplorable neglect; but it is now being thoroughly renovated under the care of Mr. J. Harden, an intelligent and enthusiastic gardener. The noble plant of Magnòlia conspícua, of which an account was given by Sir Abraham in the first Volume of the *Gardener's Magazine*, is now upwards of 20 ft. high, and covered with blossom-buds. The wall trees had run quite wild, the plums and cherries having spurs a foot long; but all is now being brought into order. — *D. B. Jan.* 19. 1843.

A Metropolitan Model Institution for improving the Dwellings of the industrious Classes is now being formed. A main object of this institution will be to erect a building combining a number of habitations for workmen, having every requisite accommodation for health and comfort; and to show that such buildings, when let at a reasonable rent, will afford an adequate return for the money expended. Such a combination as we have shown in the *Encyclopædia of Cottage Architecture*, § 493., and in the *Supplement to Cottage Architecture*, p. 1149., under the head of "A College for single working Men," will probably be attempted, and we have no doubt success will be fully attained. We have been trying to get such a college erected ever since 1819. — *Cond.*

Araucària Cunninghàmi is here 10 ft. high and 8 ft. wide, with three solitary cones on the points of three of the lateral shoots of the two uppermost tiers of branches. The cones are ovate, sessile, 1 inch in width, and half an inch in length; they consist of narrow, slender, bristly, somewhat recurved brownish scales, densely imbricated. — *G. Lawrence. Hendon Vicarage, Jan.* 10. 1843.

Pícea spectábilis. — Of this fine tree we have two specimens, each bearing seven cones. — *Idem.*

Pìnus Sabiniàna has one cone. — *Idem.*

An Oak (Quércus pedunculàta) in the park of Hazel Grove, Castle Cary, Somersetshire, [of which a lithograph has been sent us,] is 82 ft. high, 30 ft. in circumference at 3½ ft. from the ground, and it contains 863 cubic feet of timber, though it has lost many of its largest limbs. It is in full vigour and bears every year abundance of small acorns in pairs at the end of long stalks. Near this tree are several other oaks of great height, and from 18 in. to 23 ft. in circumference. An elm in the same park, blown down some time since, measured 39 ft. in circumference; and an ash 21 ft. — *P. J. M.*

The Mistletoe on the Oak may be seen at Penporthlenny, in the parish of Goltre, Monmouthshire; and also on a tree near Usk. It may be interesting to some to have these habitats added to those already given in your *Arboretum Britannicum.* — *Jane Williams. Glastonbury, Oct.* 22. 1842.

Verbèna Melíndres and V. *Tweedieàna* have stood out here the last winter with no other protection than their own uncut branches. They died back to the collar of the roots, but broke well again in spring, more especially *V. Melíndres*, and they grew much more vigorously during summer than plants raised from cuttings in spring. Our flower-garden is a level spot on the south side of a steep hill overhanging Swansea. The soil is a strong loam, from 9 to 18 inches deep, on stratified rock dipping to the north. It becomes rapidly dry and hard after rain. — *P. Walker, Gardener to R. Grenfell, Esq. Maesteg, near Swansea, Oct.* 22. 1842.

Melons grown in Leaves. — At Taplow Lodge, Bucks, melons have been for many years past grown in leaves raked up the preceding autumn. The plants are raised in loam in the usual manner, and a crop of early potatoes having been first grown on the leaves, the melons are turned out of the pots to succeed them. They bear abundantly, and the fruit is of excellent flavour. — *J. B. Uxbridge, Dec.* 10. 1842.

Mushrooms this year (1842) have been most unusually abundant in August and September, and very great quantities have been gathered fine and large; some measuring 30 in. round. Many of the agricultural labourers' families have made a guinea a week during these months, by gathering them in the fields and selling them in the neighbourhood. — *M. Saul. Garstang, Lancashire, Oct.* 10. 1842.

Cucumbers this year (1842) have been very abundant in the cottager's gardens here. They are attended with very little trouble or expense, and are of great benefit to the cottager and the labouring man in hot weather, being found of great advantage in removing thirst, with the addition of a little vinegar, when taking their meals, far more so than either milk or beer. The cottagers' mode of growing is, in the first place, to obtain a few plants from their neighbours who have them in the open ground, and plant them in the spot where they have taken up their early potatoes in July, without adding any manure. I have seen some so planted this season produce cucumbers weighing from 2 to 3 lb. each, without any protection, but merely growing in the beds the early potatoes had been removed from. To keep the fruit clean when growing, they put what is here called a turf or peat under them, such as they use for fuel; they use no coal for fuel here. I have no doubt you would have been much pleased if you had had an opportunity of seeing those cucumbers growing in the cottage gardens, and might have said much in their praise. There is at this time growing up to a saw-pit side in the wood yard of Henry Masden, at Cobus, near Garstang, a cucumber which weighs 52 oz. The roots are merely growing in a few road droppings from the horses, gathered from the road side. The plants have produced abundance of fruit, without the least protection, in September. — *Idem.*

SCOTLAND.

Bust of Dr. Neill. — In consequence of a resolution passed at the General Meeting of the Caledonian Horticultural Society, of 1st December last, to place in their New Hall a marble bust of their excellent secretary, Dr. Neill, for his long and valuable gratuitous services rendered to the Society since its commencement in 1809, now a period of thirty-three years, it was suggested, by several practical gardeners, that the exertions of that gentleman having been eminently instrumental in promoting and sustaining the high character of Scottish gardeners, and the science of horticulture in all its branches, they should come forward as a body and subscribe for a testimonial to be presented to him in their name; and in order to ascertain what might be the general feeling in this respect, a number of the most influential gardeners have been written to; all of whom [as is proved by extracts from their letters] are most anxious that it should be carried into execution; and, in order to do this the more effectually, the following individuals have agreed to act as a committee, viz., Mr. Edward Sang, sen., Kirkaldy; Mr. W. M'Nab, Royal Botanic Garden, Edinburgh; Mr. S. Murray, Royal Botanic Garden, Glasgow; Mr. C. M'Intosh, Dalkeith Park; Mr. J. Smith, Hopetoun House; Mr. J. Dodds, Scone Palace; Mr. John Young, Archerfield; and Mr. R. Watson, Moredun; Mr. W. M'Nab, convener; Mr. J. M'Nab, treasurer.

To this paper are appended letters approving of the resolution from the following gardeners and nurserymen: —

Nicol Cathie, Airthrey Castle.
James Dodds, Scone Palace.
William Sharp, Pitfour.
Edward Sang, Kirkaldy.
James Smith, Hopetoun House.
John Robertson, Kinfauns Castle.
John Gow, Tullyallan Gardens.
Robert Arthur, Edinburgh.
Stewart Murray, Royal Botanic Gardens, Glasgow.
Thomas Bishop, Methven Castle.
William Lawson, Greenock.
John Addison, Gosford.
John Davidson, Culzean Castle.
John Young, Archerfield.
Alexander Smith, Callander House.
Robert Watson, Moredun Gardens.
Charles Lawson, Edinburgh.
Andrew Turnbull, Bothwell Castle.
James M'Intosh, Drumlanrig Castle.
Archibald Gorrie, Annat Cottage.
John Westwood, Academy Gardens, Dollar.
Joseph Bain, Beaufort Castle.
James Mathison, Melville House.
John Petrie, Cullen House.
D. Montgomery, Buchanan House.
William M'Nab, Royal Botanic Garden, Edinburgh.
William Barron, Elvaston Castle.
William Pearson, Cally House.
Peter Crocket, Raith Gardens.
Charles M'Intosh, Dalkeith Park.
James Sinclair, Castle Toward.
Daniel Ferguson, Royal Botanic Garden, Belfast.
George Shiells, Erskine House.
George Saunders, Gordon Castle.
James Smith, Monkwood Grove.

It is highly gratifying to us to see so many highly respectable men and excellent gardeners bearing testimony to the great services rendered by Dr. Neill to the horticulture of Scotland, and to his urbanity and kindness to gardeners. For our own part, we can only heartily join in the expression of Mr. M'Nab of the Edinburgh Botanic Garden, that we "have had the honour of Dr. Neill's acquaintance for upwards of thirty years, and can say with perfect sincerity, that we do not believe there is another individual now in existence who is more entitled to their gratitude. His whole life has been devoted to usefulness in almost every department of science, but more especially to that of gardening, and the advancement of gardeners." Perhaps there is no Scotch gardener more obliged to Dr. Neill than we are, since it was from his article HORTICULTURE in the *Encyclopædia Britannica* that we took the idea of the arrangement of the *Encyclopædia of Gardening*. The subscriptions are limited to sums from 2*s.* 6*d.* to 10*s.* 6*d.*, and the thirty-eight gardeners whose names are given above have subscribed from 5*s.* to

10*s.* each. Subscriptions are received by Mr. James M'Nab of the Experimental Garden. — *Cond.*

Foreign Trees which thrive in Shetland. — At a meeting of the Botanical Society of Edinburgh, on November 10. 1842, Mr. Edmonston, jun., mentioned in our Volume for 1840, p. 102., gave an account of the botany of Shetland. The whole is extremely interesting; but, as it will be published in the *Transactions of the Botanical Society*, we shall confine ourselves to an extract relating to arboriculture in that island. "A number of experiments have been carried on by my father for five or six years, in order, if possible, to ascertain what foreign trees will endure this climate. He obtained from Messrs. Lawson of Edinburgh all the more generally cultivated trees and shrubs, North British, North American, and North Asiatic, and the result has been as follows. Among the indigenous trees of Scotland, the ash appears to stand as well as any other, as it puts forth its leaves late and loses them early. Of the scarcely indigenous, or naturalised species, the sycamòre appears to be the hardiest; while the birch and Scotch pine will scarcely live a year. Again, *P*ìnus montàna and *Æ'*sculus Hippocástanum, comparatively tender plants, appear to thrive well; and *P*ỳrus aucupària, which is indigenous with us, thrives tolerably in cultivation. Almost all the willows do well; *S*àlix Russell*iàna*, frágilis, cinèrea, viminàlis, and vitellìna, among the best. The alder is rather too early in putting forth its leaves; but some poplars appear to do well, especially the white, black Italian, and Lombardy; and *P*ópulus nìgra * is indigenous. Oak and beech will not thrive at all. Generally speaking, evergreens, both trees and shrubs, appear not to suit. *P*ìnus *Cémbra*, the black, white, and Norway spruce have all been repeatedly tried, but seldom languished a year. Even the hardy shrubby evergreens, which are met with indigenous or in every shrubbery on the mainland, such as *I'*lex *A*quifòlium, *R*hododéndron pónticum and flàvum, *V*ibúrnum *T*ìnus, &c., die almost immediately. Among the best-thriving evergreen shrubs may be mentioned, *A'*rbutus mucronàta, Cotoneáster U'va-úrsi, *H*édera *H*èlix, &c. The latter, indeed, is native, and in some situations thrives remarkably well, as it also does in Orkney." — *Cond.*

A good Tablet for the Indication of the Name of a Street, or a Guide-Post to a Cross Road. — It should be, 1st, readily discoverable and distinguishable; 2d, easily legible at moderate distances, and by oblique as well as by direct vision, in diffused light, or in sunshine; 3d, of such material as to be lasting and easily kept in a serviceable state.

No tablet which I have met with fulfils these conditions so entirely as that which was widely diffused in Paris during the administration of M. Chabrol de Volvic. The material is volcanic stone in thin slabs; these slabs are covered by hard blue enamel, and the inscription is in white enamel burnt in. They are immediately distinguishable from all other inscriptions or signs, are very legible in all states of the weather, and appear to be unaltered after several years' exposure.

It unluckily happens that the cost of these tablets is such as to make them unattainable generally.

The next best model, in point of distinctness, is that which has long been in general use in the town of Birmingham, viz. cast-iron plates, with the inscription in slightly relieved letters. This model, which, if judiciously executed, is but little inferior to M. Chabrol's in distinctness, has a manifest advantage over it in cheapness and in strength. Some tablets on this plan were, several years ago, introduced in Edinburgh, and have answered well as far as they went; but, subsequently, changes have been introduced which have notably impaired their efficiency; the original proportion of the letters to the spaces has been altered so much as to make them illegible, unless when seen nearly from the front, and the colours of the ground and letters have been inverted (the ground being now white). This last change has been particularly detrimental, as, when the sun shines obliquely on them, the shadows of the raised letters fill the spaces between them, and turn the inscription into an illegible black stripe; it has, besides, had the effect of giving the tablets a close resemblance to the tickets on houses to let.

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* A specimen of poplar which we received from Mr. Edmonston, sen., some years ago, appeared to us to be *P.* balsamífera; at all events we are quite certain it was not the *P.* nìgra of *English Botany;* but we have written to Mr. Edmonston for a plant. — *Cond.*

Among the models in the Paris collection was one which does not appear to have had a fair trial anywhere, and which, if on enquiry it should be found to be available in point of cost, appears to offer considerable advantages.

These tablets were very similar in form to the Birmingham pattern, though thicker in substance. The material was a sort of earthenware, analogous to that of which we make greybeards and pickling jars in this country. If such tablets were first fired with a hard lustreless blue enamel, and then the surfaces of the letters enamelled white, a very perfect tablet would be the result. (*Civis*, in the *Scotsman*, Dec., 1842.)

IRELAND.

Agricultural Improvement. — The following is an extract of a letter received by Messrs. Drummond, of the Agricultural Museum, from Mr. M'Leish, land-steward on one of the estates of the Marquess of Waterford, in Ireland. Mr. M'Leish, after alluding to the implements furnished by the Messrs. Drummond for the estate, consisting of sixty full sets of draining tools, with subsoil and furrow plough, and expressing himself highly pleased with their superior excellence, proceeds to say: " The Marquess of Waterford has about 40,000 acres of land in the county of Derry, on which there are about 800 tenants, but until this season there had not been anything done by them in the way of draining their land on any regular system. But, by advice and encouragement held out to them by Mr. Beresford, agent to the marquess, upwards of sixty of the tenants have been and are thorough draining on Mr. Smith of Deanston's system, and have already completed upwards of 16,000 perches (5½ yards each) of drains, all filled with broken stones. Being only a few months since the principle was fairly laid down to them, they seem to embark in it with spirit; and, from the satisfaction it is giving, not only to those who have adopted it, but also to those who have been watching its effects, I have no doubt that ere long every tenant on this estate will be thorough draining. They have suffered so much from wet for the last five or six years, and now from the lowness of the markets, that they seem quite aware that, unless they try some method of improving their land, so as to be able to raise an additional quantity of grain to compensate for the low prices, they will not be able to pay their rents; so they have determined on thorough draining and subsoiling, which certainly is the first and best step, for nine acres out of ten require it. The qualities of the soils on this estate are variable, but well adapted for draining, and can be thoroughly drained with broken stones for about 5*l.* per imperial acre on the average. The tenants here do the work at their own expense in the first instance, but, when finished in a proper manner, Mr. Beresford pays them the full amount of what it cost them, on their agreeing to pay interest for the same at the rate of five per cent per annum during the term of their lease. — *Cammish, near Dungiven, Sept.* 29. 1842." (*Stirling Advertiser*, Oct. 14. 1842.)

ART. IV. *Retrospective Criticism.*

ERRATA.— In our Vol. for 1842, p. 594., line 28. from the top, for " an overshot water-wheel" read " four overshot water-wheels." In p. 593., lines 1. and 33. from the top, for " Grampians" read " Ochils."

In p. 624., line 14. from the bottom, for "three thousand" read "thirty thousand;" and in p. 625., line 5. from the top, for "destruction" read "dispersion."

In our last Number, p. 35., under fig. 1., for "*Sìda pulchélla*" read "*Plagiánthus Lampènii.*"

Thoughts on modern Burying-Grounds. (Vol. for 1842, p. 616.) — In visiting the country I have often regretted the very slovenly and neglected state of the churchyards. If they were judiciously planted with Irish yew, cypresses, junipers of different kinds, hollies, box, and other dark evergreens, the grass kept short, and the nettles and brambles destroyed, they would interest the spectator, and tend to keep alive a taste for neatness and decency generally amongst the poorer classes. I cannot doubt but that a great improvement would speedily take place if the public mind were roused on this subject; and I do think it is of more real importance than may appear at first sight, and your pen would be very powerful if applied to cure this foul disease, though it may be a hereditary one. Pray give the subject that consideration which it deserves; and draw up yourself, or get some of your correspondents to draw up, a paper, comparing the general states of churchyards in the country with what they might be made by a little attention, and at an expense which the frequenters of the churches would not grudge. I think the Church Society would be very much indebted to you for such a paper, and also that they would cause it to be printed and extensively circulated amongst the clergy. If I stop in a village I generally make a point of visiting the churchyard. I like to see the names, ages, &c.; but, as I said before, it is generally accompanied with regret at seeing the very slovenly manner in which they are allowed to remain. The churchyard at Henbury near Bristol is an exception; and one of the neatest village churchyards I have ever seen is about two or three miles west of Henley-on-Thames, but I forget the name at this moment. The churchyard walls, and sometimes even the churches themselves, would be much improved in appearance by ivy being planted to grow up over them. — *H. T. Dec.* 5. 1842.

Our readers will find a great many remarks on cemeteries and churchyards, both at home and abroad, in the Notes of our Tours, but we fear little good will be done till the clergy can be induced to take up the subject; which, happily, in various places they are now doing. The formation of public cemeteries, which are in general kept in a very superior manner to what churchyards are, will contribute to the same desirable end. — *Cond.*

Roots and Tops of Trees. — Although Mr. Barnes has of late given some very useful information on this subject, still I may be allowed to make a few remarks on what he says about orange trees in your Vol. for 1843, p. 24. He observes: "I purposely keep their heads from growing this season to any extent, because they should make themselves properly strong at bottom first of all." By this are we to understand that if trees were allowed to make large tops, that would prevent them from making roots? If so, it is against the received opinion, nay, the fact, that roots of trees extend accordingly as their branches do; for, if otherwise, how is it that those who understand the culture of vines do not prune them the first summer or two after they are planted, but allow them to grow wild, if I may say so, solely with the view of encouraging their roots? Mr. Crawshay, the celebrated horticulturist, always adopted that plan with his young vines; but, as Mr. Barnes mentions that he has "a great deal to say some day on the culture of the vine," perhaps he will then throw more light on the subject. — *J. Wighton. Cossey Gardens, Jan.* 6. 1843.

Lime-water for killing Worms. — I hardly know what you consider a fair trial of lime-water for a lawn infested with these pests; but I have tried it so often, and so long, that I give it up. You say, after the worms have come above ground, do so and so; why, my good Sir, that is the very point at issue between us. I cannot make them come up; the last time I tried, not one out of fifty showed their faces. The truth is, we are ignorant of the habits of these groundlings. At certain times they lie so deep in the earth, that all the lime-water you could apply to them would not make them come forth; and, unless you do that, you do nothing. I believe at this very time, if I were to pour hogsheads of lime-water on my lawn, I should not kill any worms worth notice — *S. T. April* 20. 1842.

Saul's Potato-Planter, &c. — I think but little further can be added to the account of the potato-planter and its uses given in p. 40. The plan has been tried in planting the winter potatoes in the fields; and, as an experiment on it, last season, a field was divided into parts; one half was planted by the plough, and the other half by the planter. The manure having been put into the ground, and covered up by the plough, the potatoes were planted by the planter fig. 4. (given in p. 41.), and the ground was then harrowed over. As soon as those potatoes made their appearance above ground, their foliage looked more luxuriant and stronger than those set by the plough, and when taken up had a more abundant produce, and well repaid the owner for the extra labour. As I before stated, it may be done by boys or aged persons, and would prove a benefit to the working classes, as it is highly desirable that every means should be used to prevent persons being sent to the workhouse; and there is no doubt that, if employment could be furnished, it would be to the advantage of the farmer, and a great pleasure to the labourer to work for small wages rather than be forced into the workhouse. As a proof of this, there are here, at the present time, farmer's labourers working for 8*d*. per day and their victuals, who have wives and three or four children to support out of this small sum; but who are quite satisfied with this rather than go to the workhouse: they have also rent to pay out of this small sum, as well as supporting their families. Bad as this may appear, I am sorry to say that many of the families of the Irish farmer's labourers are in a far worse condition, as may be seen in a work lately published in 2 vols. by Mr. Bins of Lancaster, who travelled through Ireland. It is entitled the *Beauties and Miseries of Ireland*, a work well worth being read by every thinking man of the present time.

I shall close by giving an account of an extraordinary crop of potatoes grown by Mr. Hodgson of Poulton le Fyld. At first sight it may appear as if not true, but it is a fact. In May last he cut into sets 20 potatoes, and planted them, the produce of which, when got up, was no less than ten bushels and a half, or three windles, as it is called here, which is 720 lb. This produce, I think, is worthy of recording in the *Gardener's Magazine*. — *M. Saul. Garstang, Dec.* 29. 1842.

ART. V. *Queries and Answers.*

KENT, the Landscape-Gardener.—At the end of one of your Magazines, you ask for information respecting (among others) Kent the landscape-gardener. I find this extract in the notes I made when reading Hunter's *Deanery of Doncaster*, a most learned and valuable local history. I cannot at this distance of time recollect whether I extracted the whole or only the most important part of what related to Kent.

"The family of Kent, who have been numerous in the parish of Rotherham, and have produced several clergymen, may seem to have a claim to William Kent, the artist, who did so much to improve the public taste in gardening. Vertue says he was a native of Yorkshire; and the following entry in the Parish Registry of Rotherham agrees well with the time of his birth. '1684, March 27. bap. William, son of Richard Kent.'" (Vol. ii. p. 13.)

In looking for this memorandum, I found also the following extracts, which may not be uninteresting to you.

"*Repton* .... was accustomed to say that the groups of oaks, thorns, yews, and other trees were more picturesquely combined at Langold than at any other spot in the country." (Vol. i. 299.)

Langold is near Rotherham, and is now the property of H. Gally Knight, Esq. M. P., a gentleman who inherits the fine taste of his predecessors.

" *Aston* still exhibits evidence of the favourite employment of Mr. Mason." (Vol. ii. p. 168.) If I remember right he was vicar of Aston.

Tankersley Park.—" Before 1654, Lady Fanshawe, speaking of Tankersley Park says: ' I found .... the country plentiful and healthy, and very pleasant, but there was no *fruit* in it till we planted some, and my Lord Strafford says now, that what we planted is the best fruit in the North.' " Hunter adds: " The fact which Lady Fanshawe notices, that before her time there was no fruit in this part of the country, is curious: but perhaps the statement is to be taken with some qualification. I find Dr. Berrie cultivating strawberries at Hodroyd before this time. The Fanshawes were great gardeners. Sir Henry Fanshawe had a curious garden at Ware." (Vol. ii. p. 303).

Tankersley is about half-way between Sheffield and Barnsley, westward of the road. Hodroyd is 5 miles N. E. of Barnsley. I am inclined to think that Lady Fanshawe's account is more literal than Hunter seems disposed to think. The old accounts of the great families might, perhaps, if properly kept, throw some unexpected light on points like these. — *Thomas Wilson. Crimbles House, near Leeds, Oct.* 9. 1842.

An evergreen Larch has been discovered in his plantations by a gentleman in the neighbourhood of Carmarthen; and he is anxious to know if any of our correspondents have seen or heard of an evergreen larch. He also wishes to know,

Whether the Larch can be propagated by Cuttings. — To this question we answer, that every ligneous dicotyledonous plant whatever, that produces a shoot long enough to have two or three buds on it, can be propagated by cuttings; because every such plant, when wounded into the soft wood, has an inherent power of healing that wound; because the healing process consists in the protrusion of granulated matter from the upper lip of the wound; and this granulated matter protrudes roots when placed in favourable circumstances. If, then, the cutting be cut directly through where it has been wounded, immediately below this granulated matter, and planted in sand, roots will be produced from the granulations. It is true that the process is much more rapid and certain in some plants than in others, but in all it will take place, if the operation of cutting into the soft wood is properly performed on the lower part of a shoot still growing, but just beginning to ripen its wood, and the cutting afterwards carefully planted in sand, and kept in a state of uniform temperature and moisture. In many cases the cutting may be taken off at once, without waiting for granulations; in others, it may be ringed or notched immediately under a bud; in some cases, a slit may be made vertically through a shoot where there is a bud or joint, and the slit kept open by a wedge till it has granulated on the edges of the wound. It may then be cut off across the joint, or rather towards its lower extremity. Roses, rhododendrons, azaleas, arbutus, and a great many trees and shrubs that are commonly propagated by layers, may be increased in this manner, as Mr. Cooper, late of the Epsom Nursery, but now possessor of the Brixton Nursery, has abundantly proved; and we should think it the most certain mode with the evergreen larch, making the slit an inch or two in length, through the lower part of the shoot, in the month of July, when it is just beginning to ripen. There are a great many other modes of applying the principle, not only to shoots containing woody matter, but even to leaves, many of which, from the common cabbage to the orange, if wounded at the lower extremity of the petiole before the leaf has quite done growing, will granulate, and, when planted, produce roots. See this matter treated in detail in the *Suburban Horticulturist.* — *Cond.*

THE
GARDENER'S MAGAZINE,
MARCH, 1843.

ORIGINAL COMMUNICATIONS.

Art. I. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the Conductor.

The circumstance of being employed by the Directors of a Cemetery Company at Cambridge to form a plan for their guidance in arranging the ground, and in working and managing the cemetery afterwards, led us to study the principles on which all the arrangements connected with cemeteries are, or ought to be, founded, and the following pages contain the general results of our enquiries. The subjects discussed are:

I. The Uses of Cemeteries.
II. The Laying out, Planting, and Architecture of Cemeteries, with a view to these uses.
III. The Working and Management of Cemeteries.
IV. Certain Innovations suggested, relative to the Selection of Ground for Cemeteries, and the Mode of performing Funerals, &c.
V. A Design for a small Cemetery on level Ground, of moderate extent, exemplified in a cemetery now being formed at Cambridge, illustrated by a plan, sections, and an isometrical view.
VI. Design for a Cemetery on hilly Ground, with an isometrical view.
VII. The present State of the London Cemeteries, considered as cemetery gardens.
VIII. The Improvement and Extension of Country Churchyards, illustrated by plans.
IX. A List of Trees, Shrubs, and perennial herbaceous Plants, adapted for Cemeteries and Churchyards.

I. The Uses of Cemeteries.

As, to know the best mode of applying the principles of design to any particular object, it is necessary to know the purposes for which that object is intended, we shall commence by considering the *uses* for which cemeteries or burial-grounds are required.

The *main object* of a burial-ground is, the disposal of the remains of the dead in such a manner as that their decomposition, and return to the earth from which they sprung, shall not prove injurious to the living; either by affecting their health, or shocking their feelings, opinions, or prejudices.

A *secondary object* is, or ought to be, the improvement of the moral sentiments and general taste of all classes, and more especially of the great masses of society.

With respect to the first and most important object, the decomposition of the dead, without the risk of injury to the living, there is, as we think, but one mode in which this can be effected, to which there can be no objection on the part of the living; and that is, interment in a wooden coffin in the free soil, in a grave 5 or 6 feet deep, rendered secure from being violated, in which no body has been deposited before, or is contemplated to be deposited thereafter.

Various circumstances, however, into which it is needless to enquire, have given rise to burying several bodies in the same grave in the free soil, and to modes of sepulture by which the decomposition of the body, or at least its union with the earth, is prevented; such as the use of leaden or iron coffins, and depositing them in vaults, catacombs, and other structures, in which they can never, humanly speaking, except in the case of some great change or convulsion, be mingled with the soil, or, in the beautiful language of Scripture, be returned to the dust from which they sprung. Though we are of opinion that the modes of burial which prevent the body from mixing with the soil, which, for the sake of distinction, we shall call the sepulchral modes, cannot, on account of the danger to the living, be continued much longer in a highly civilised country, yet, in considering the conditions requisite for a complete cemetery suited to the present time, the various modes of sepulchral burial at present in use must be kept in view. The expense of the sepulchral mode, however, confines it to the comparatively wealthy; and hence by far the greater part of burial-grounds always was, and is, necessarily devoted to interments in the free soil. In some churchyards where there is abundance of room, only one coffin is deposited in a grave; but in most cases, and particularly in the burial-grounds of large towns, the graves are dug very deep, and several coffins, sometimes as many as a dozen, or even more, according to the depth of the grave, are deposited one over another, till they reach within 5 or 6 feet of the surface. Interments in this manner are of two kinds. The first are made in family graves, in which the different members of the same family are deposited in succession, in the order of their decease; and to such graves there is always a grave-stone or some kind of monument. The second are what are called common graves, to which there is no monument, and in which the bodies of the poor and of paupers are deposited, in the order in which they are brought to the cemetery; probably two or three in one day, or possibly as many in one day as will fill the grave. Unless this mode were adopted in the public cemeteries, they would, from their present limited extent, very soon be filled up. Such graves, whether public or private, in the newly formed cemeteries, when once filled with coffins to within 6 ft. of the surface, are understood never to be reopened; but, in the old burial-grounds, they are in many cases opened after being closed only four or five years, and sometimes much sooner.

When the parties burying cannot afford to purchase a private or family grave, the practice is, in some burial-grounds, to bury singly in graves of the ordinary depth of 6 or 7 feet, and these graves are reopened for a similar purpose in six or seven years; but, as this is attended with the disinterment of the bones, it is a very objectionable mode. In a burial-ground properly arranged and managed, a coffin, after it is once interred, should never again be exposed to view, nor a human bone be disturbed. At present this is only the case in the cemeteries of the Jews, where there is a separate grave for every coffin, and where the graves are never reopened. It is also the case in the cemeteries of the Quakers; though not, we believe, from religious principle, as in the case of the Jews, but rather from that general regard to decency and propriety which is a characteristic of that sect of Christians, and perhaps, as in the case of the Moravians, in consequence of their comparatively limited number.

As *data* to proceed upon with reference to interments in the free soil, it is necessary to state that the muscular part of the body either decays rapidly, or dries up rapidly, according to the circumstances in which it is placed; but that the bones do not decay, even under circumstances the most favourable for that purpose, for centuries.

The face of a dead body deposited in the free soil is generally destroyed in three or four months, but the thorax and abdomen undergo very little change, except in colour, till the fourth month. The last part of the muscular fibre which decays is the upper part of the thigh, which in some subjects resists putrefaction for four or five years. In general, a body is considered unfit for dissection after it has been interred eight or nine weeks. In a very dry and warm soil, especially where the body is emaciated, the juices are rapidly absorbed; and, no moisture coming near it, the solids contract and harden, and a species of mummy is produced. This may be observed in the vaults of various churches in Britain where the soil and situation are remarkably dry; and it has given rise to those appalling scenes which may be witnessed in the vaults of Bremen, Vienna, Rome, Naples, Palermo, Malta, and other places. (See *Necropolis Glasguensis*, p. 48. to 55.; and Stephens's *Incidents of Travel*, as quoted in the *Saturday Magazine*, vol. xx. p. 141.)

Bones are chiefly composed of phosphate of lime deposited in gelatine, an animal tissue; and, unless acted on by powerful acids, they will endure, either in the soil or in the atmosphere, for many centuries. They are even found in the fossil state, and after ages of exposure often contain more or less of the original animal tissue, particularly if they have been embedded in clayey soil. In the ante-hominal part of the creation, there are bones daily discovered which have existed 6000 years at least. Dr. Charles Loudon informs us that he has seen numerous human bones in certain caves near to Naples, which are supposed to be those of the Grecian colonists who settled there before the Christian era, or perhaps those of an older race who inhabited Magna Græcia.* Dr. Loudon has seen several skeletons dug out of the ruins of Pompeii, the bones of which were as dry and entire as the bones of skeletons which we see in dissecting-rooms, though they must have lain there nearly 1800 years under the lava, which, around them, seemed to be a dry greyish kind of earth. Even while writing this, we read in the newspapers (*Morn. Chron.*, Jan. 10.) of the workmen, while digging a deep sewer in Lad Lane in the city, having cut into what is supposed to have been a cemetery of the Romans, and dug up a number of human bones.

With respect to *prejudices*, there is, as every one knows, a decided prejudice in favour of being buried in dry soil, and against the placing of decomposing substances, such as quicklime, in coffins; and it is one of our principles to respect existing prejudices as well as vested rights. With regard to the use of quicklime; independently of the existing prejudices against its introduction in coffins, it is found to cause the solution of the softer parts of the body, which, unless the coffin is watertight, and this is rarely the case with the coffins either of the poor or of the middling class, oozes out to such an extent that the undertaker's men can scarcely carry the coffin, on account of the flow of matter and the odour.

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* The desire to preserve the bones from decay seems natural to man, both in a rude and a civilised state. Dr. Dieffenbach informs us that the New Zealanders expose the bodies of their dead, in a sort of canoe-shaped coffin, among the foliage of trees, for several months, till the flesh is sufficiently decomposed; the bones are then washed and cleaned, and finally deposited in some secret spot in a wood, or in a limestone cavern, of which there are many, or in some chasm of the rocks difficult of access. The bodies of hereditary chiefs are dressed and ornamented, and preserved in mausoleums of elaborately carved work; but, even in this case, after a time, the tohunga, or priest, removes the bones to a place in the forest often known only to himself. (*Travels in New Zealand*, ii. p. 63.) The monks of the Convent of Mount Sinai, Mr. Stephens informs us, bury their dead for about three years, after which they take them up, clean the bones, and deposit them in one great pit; except those of the archbishops, which are preserved separately in an adjoining sepulchre, some in baskets, some on shelves, and others tied together and hanging from the roof. (*Incidents of Travel.*)

The health of the living is chiefly affected by a certain description of gas, respecting which it is necessary to enter into some detail. The decomposition of the muscular part of the human body takes place with different degrees of rapidity in different soils, and at different depths in the same soil. It is most rapid in sandy soils somewhat moist, within 3 or 4 feet of the surface, and in a warm climate; it is next in rapidity in chalky soils; much slower in clayey soils; and slowest of all in peaty soil, saturated with astringent moisture. In general, dry soil, and a moderate distance of 5 or 6 feet below the surface, are favourable both to decomposition and human prejudices. In such soil, in the climate of London, the muscular part of the human body will have become a black mould in between six and seven years; but, practically speaking, the bones may be considered as indestructible. In the progress of decay, the first change which takes place immediately after death is, the escape of a deleterious gas from the mouth and nostrils, but generally in so small a quantity as not to be perceptible for three or four days. In some cases, it is perceptible in a much shorter period; and in all a gas accumulates within the body, which escapes sooner or later according to the progress of the putrescent process. If the body is buried in the free soil, in a wooden coffin, to the depth of 5 or 6 feet, the gas escapes into the soil, and is, in part at least, absorbed by it, and consequently does not contaminate the air above the surface; but, if a leaden coffin is used, and the body is deposited in a vault, catacomb, or brick grave, the gas escapes within the coffin, and either remains there till the coffin decays, or escapes through crevices in the lead, and through small holes bored on purpose by the undertaker in the outer wooden coffin and leaden inner coffin, and concealed by the name-plate. (*Report on the Health of Towns, Walker, &c.*) By the last mode the gas begins to escape before the corpse is taken from the house; and its effect is often felt there, as well as when the service is being read over it in the chapel, and even after it is deposited in a vault, the catacombs of which, though apparently hermetically sealed, are seldom air-tight. Sometimes the body, especially of a corpulent person, swells so much before it is removed from the house, that it is ready to burst both the inner and the outer coffin; and in that case it requires to be tapped, and the gas burnt as it escapes, or the operation performed close to an open window. Even in some of the public catacombs of the new London cemeteries explosions have been known to take place, and the undertaker obliged to be sent for in order to resolder the coffin; which shows the disgusting nature of this mode of interment, and its danger to the living. To inhale this gas, undiluted with atmospheric air, is instant death; and, even when much diluted, it is productive of disease which commonly ends in death, of which there is abundant evidence in Walker's *Grave-Yards* and the Parliamentary Report quoted. The gas abounds to a fearful extent in the soil of all crowded burial-grounds, and has been proved to be more or less present in the soil thrown out of graves where bodies have been interred before. Even in the new London cemeteries, when interments are made in family graves, or common graves, which have been filled in with earth, such is the smell when the grave-diggers arrive within 2 or 3 feet of the last deposited coffin, that they are obliged to be plied constantly with rum to induce them to proceed. This is more particularly the case when graves are dug in strong clay, because the gas cannot escape laterally as in a gravelly or sandy soil, but rises perpendicularly through the soil which has been moved. The remedy for this evil is, never to allow a family grave, or a common grave, in which an interment has been made, to be excavated deeper than within 6 ft. of the last deposited coffin; and, to make sure of this, there ought to be a protecting stone, or slate, to be hereafter described, deposited when the grave is being filled, at the height of 6 ft. above the last coffin, under a severe penalty. It is only by some regulation of this kind, that burying several coffins in deep graves can be conducted without injuring the health of grave-diggers; and without the gas, which escapes from the earth brought up, endangering the health of those who may be occasional spectators.

In the years 1782 and 1783, when the disinterment of the burying-grounds of Les Innocents in Paris took place under the direction of some eminent French chemists, these philosophers endeavoured to analyse this gas, but were unable to procure it. Fourcroy, speaking in their name, says:—"In vain we endeavoured to induce the grave-diggers to procure any of this elastic fluid. They uniformly refused, declaring that it was only by an unlucky accident they interfered with dead bodies in that dangerous state. The horrible odour and the poisonous activity of this fluid announce to us that if it is mingled, as there is no reason to doubt, with hydrogenous and azotic gas holding sulphur and phosphorus in solution, ordinary and known products of putrefaction, it may contain also another deleterious vapour, whose nature has hitherto escaped philosophical research, while its terrible action upon life is too strikingly evinced. These Paris grave-diggers know," Fourcroy adds, "that the greatest danger to them arises from the disengagement of this vapour from the abdomen of carcasses in a state of incipient putrefaction." (See *Annales de Chimie*, vol. v. p. 154., as quoted in Walker's *Grave-Yards*, p. 86.; and Ure's *Dictionary of Chemistry*, art. Adipocere.)

While this inflation from gas is going forward, the aqueous part of decomposition, a "fetid sanies," exudes from the body, and sometimes, when interment is delayed too long, to such an extent as to drop from the coffin before it is taken out of the house. This exudation, as already observed, is greatly accelerated and increased by putting quicklime into the coffin. In the free soil this fetid sanies is diffused by the rain in the subsoil, and carried along in the water of the subsoil to its natural outlet, or to the wells which may be dug into it; and thus, while the gas of decomposition poisons both the earth and the air, the fluid matter contaminates the water.*

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* Speaking of the infectious agency in the houses in the neighbourhood of that part of London called Fleet Ditch, Dr. Lynch observes:—"The great primary cause is, that the privies are in general under the staircase of the wretched hovels of the poor, and the sulphuretted hydrogen, and the carbonated hydrogen, and the noxious gases there generated, are the same gases as are generated from the dead bodies in a state of decomposition; for the evacuations from the body are decomposed animal and vegetable matter, and a dead body is the same, it is decomposition of the dead body, or a general state of disorganisation, and that produces exactly the same kind of gases. There have been instances mentioned, where people have fallen down dead from a rush of those gases in a concentrated form." (*Report on Health of Towns*, &c., p. 161.)

If the public were fully aware of the dangerous nature of the gases which proceed from the decomposition of dead bodies in crowded churchyards, and in vaults and catacombs, and of the poisonous nature of the water of decomposition,

1. They would not live in houses bordering on churchyards, which, though already full, are still used as burying-grounds.

2. They would not drink the water of wells dug in the vicinity of burial-grounds, whether in town or country; because, though the filtration of the soil will purify the water from matter suspended in it, it will not free it from what is held in solution.

3. They would not attend service in any church or chapel whatever, in

With regard to the *destruction of human bones*, we assume that to be impracticable, otherwise than by means which are altogether out of the question. The most favourable soil for their decomposition is a coarse gravel, subject to be alternately moist and dry; but, though such a soil, so circumstanced in regard to water, might be found naturally, or might be composed by art, yet these cases may be considered as equally impracticable.* Instead, therefore, of endeavouring to destroy the human skeleton, let us limit our endeavours to preventing it from being desecrated by disinterment and exposure. This may be effected in various ways; but by far the most simple, effectual, and economical, as it appears to us, would be to place over the coffin, after it was deposited in the grave, a stone or slate of the same dimensions as the coffin, or even as many flat 12-inch tiles, say six, as would extend from head to foot. As the coffin and the muscular part of its contents decayed and sunk down, the stone, slate, or tiles, would follow it and press close on the bones. In consequence of this arrangement, when the ground was at any future period opened to the depth of the stone, slate, or tile, guard, it would be known that a skeleton was beneath, and the operator would cease to go farther; or, at all events, it should be rendered illegal for him to do so. If a name and date were graven in the stone, being protected from atmospheric changes, it would remain uninjured for ages, and, like the foot-marks which geologists have found in the red sandstone, might, in some far distant age, become part of the geological history of our globe. We prefer stone or tile guards, to guards of metal, because iron would soon rust, and cease to be a guard, and lead or any equally durable metal would offer a temptation to stealing. A layer two or three inches thick of stucco, Roman cement, or a plate of asphalte or oropholithe, might be used as a substitute; but stone, slate, and tiles are decidedly preferable. The slate might even be introduced within the coffin, without rendering it heavier to carry than if a lead coffin were used. Burying in a coffin made entirely of stone or slate we do not consider so likely to prevent desecration as a stone or slate guard; because there is a temptation to dig up the lower part of the stone coffin, and use it as a drinking-trough for cattle, or a cistern for a flower-garden, which is done in various places in the vicinity of old abbeys. A stone hollowed out on the under side might be better than a flat stone; because the depending edges would

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the vaults of which there were coffins, or in the floors of which interments had taken place. They would absent themselves from all such places, even if there were no immediate danger, in order, by such means as were in their power, to contribute to the discountenance of a practice by all parties allowed to be attended with disgusting and injurious results.

4. Nor would they live in houses in which the privies were not either rendered water-closets, or placed detached from the house.

5. Nor in a house adjoining an open sewer.

6. Nor would they keep a dead body in the house more than five days, or at the most a week.

* If the bones were to be destroyed in the case of a single grave, a hint might be taken from the following passage in Fellowes's *Asia Minor*. "The outward marks of respect are scarcely visible in their burial-grounds, little more being left to mark the place of interment than a row of stones indicating the oblong form of the grave; but a pipe or chimney, generally formed of wood or earthenware, rises a few inches above the ground, and communicates with the corpse beneath; and down this tube libations are poured by the friends of the deceased to the attendant spirit of the dead." (Vol. xi. p. 16.) Were the libations withheld for five or six years, till the muscular part of the body was completely destroyed, and then diluted muriatic acid employed as a libation, the result would probably be obtained in the course of a year or two.

be a kind of side protection to the skeleton ; and might, together with the name graven on the upper side, procure more respect from those who should fall upon it accidentally in future ages, in excavating for improvements.

The *space of ground required* for a single interment, and for the interments incident to any given population, requires next to be taken into consideration. If all interments took place in the free soil, if a grave were allowed for each coffin, and the grave were never afterwards to be opened, that is, not opened for several generations, then the space required for cemeteries would be considerable. Thus, supposing graves without head-stones or ornaments of any kind to occupy a surface of 7 ft. by 3 ft. 6 in., and the average area of those having grave-stones or monuments to be 10 ft. by 5 ft., then, making an allowance for grass paths between the graves, and for gravel roads, we may take 8 ft. by 4 ft. as the average space on which to calculate the capacity of a garden or ornamental cemetery. This will give 1361 graves to an acre; and, estimating the deaths in a town population at 3 per cent per annum, this acre would suffice for a population of 1000 souls for 45 years; or for a population of 45,000 for one year. Taking the population of London to be 1,500,000, this would require 33 acres annually, or the whole of that part of Middlesex not covered by London and its suburbs (128,540 acres) in the course of 3895 years. The average number of deaths annually in England and Wales has been ascertained to be about 336,000, which, at 1361 interments to an acre, would require 247 acres annually; or, supposing three interments in each grave 82 acres per annum. On the supposition that ground once occupied by graves was for ever afterwards to be held sacred, and not subjected to cultivation of any kind ; the mode of interment which would require so large a sacrifice of surface annually may be considered as impracticable; and, for our present purpose, this is the view that we shall take of it. We shall, however, hereafter show how separate graves may be procured, not only for those who cannot afford grave-stones, but even for paupers; and these graves never again opened for generations. In the meantime, the mode of burying several coffins in one grave, provided these coffins are of wood, and layers of soil not less than 6 ft. in thickness interposed, and the graves, when once filled, not opened for generations, appears the best adapted for the present state of things. Supposing that on an average three interments take place in each grave or vault before it is finally closed, this will give upwards of 4000 interments to the acre; and, as the eight public cemeteries recently formed in the neighbourhood of the metropolis, and the unoccupied part of the new burial-grounds recently formed by different sections of the Dissenters, contain upwards of 300 acres inclusive of the space occupied by roads and buildings, this will probably supply the demand for two centuries to come, even allowing the population to increase.

The *security of the grave* was, till within these few years, an important part of the considerations requisite to be had in view in constructing cemeteries. In some cases it was effected by surrounding the enclosure by high walls, or other effective fences; sometimes by constructing central watch-towers for stationary watchmen within; sometimes by employing perambulating watchmen ; at others by burying in a grave 15 or 20 feet deep ; by burying in a walled grave, covered with an iron grating built into the walls all round, some feet beneath the surface soil, and keeping the surface loose, and planted with flowers or shrubs (which, as the grave could not be disturbed without first taking these up, would by their withered state, when replanted, have told what had been attempted); and sometimes by the very extraordinary mode of letting down over the coffin a ponderous cast-iron box, to remain over it for six or eight weeks, till the body was considered to be so far decomposed as to be unfit for the purposes of the anatomist. The iron box, or case, which had remained whelmed over the coffin, but without touching it, was then disinterred, and drawn up by machinery, and the wooden coffin was covered with soil, and the grave completed a second time in the usual manner. Even the poorest families, in some parts of Scotland, went to this extraordinary expense. Fortunately a law has been passed which renders these precautions unnecessary, and we shall therefore take no farther notice of them.

The secondary object of cemeteries, that of *improving the moral feelings*, will be one of the results of the decorous attainment of the main object; for it must be obvious that the first step to rendering the churchyard a source of amelioration or instruction is, to render it attractive. So far from this being the case at present, they are in many instances the reverse, often presenting, in London and other large towns, a black unearthly-looking surface, so frequently disturbed by interments that no grass will grow upon it*; while, in the country, the churchyard is commonly covered with rank grass abounding in tall weeds, and neglected grave-stones. Cemeteries in this state "lose their monitory virtue when thus obtruded upon the notice of men occupied with the cares of the world, and too often sullied and defiled by those cares." No wonder that, under such circumstances, the burial-grounds, more especially of towns, are shunned and avoided, rather than sought after as places for meditation. Even under the most favourable circumstances, the associations which are generally attached to churchyards are gloomy and terrific.

> ——" The Grave! dread thing,
> Men shiver when thou 'rt named: Nature, appall'd,
> Shakes off her wonted firmness. Ah! how dark
> The long extended realms and rueful wastes,
> Where nought but silence reigns, and night, dark night!
> . . . . . . The sickly taper,
> By glimmering through thy low-brow'd mirky vaults,
> Furr'd round with misty damps and ropy slime,
> Lets fall a supernumerary horror,
> And only serves to make thy night more irksome."

"Why," says Washington Irving, "should we thus seek to clothe death with unnecessary terrors, and to spread horrors around the tomb of those we love? The grave should be surrounded by every thing that might inspire tenderness and veneration for the dead, or that might win the living to virtue. It is the place, not of disgust and dismay, but of sorrow and meditation." "Nothing can make amends," says Coleridge, "for the want of the soothing influences of nature, and for the absence of those types of renovation and decay which the fields and woods offer to the notice of the serious and contemplative mind. To feel the force of this sentiment, let a man only compare, in imagination, the unsightly manner in which our monuments are crowded together in the busy, noisy, unclean, and almost grassless churchyard of a large town, with the still seclusion of a Turkish cemetery in some remote place, and yet further sanctified by the grove of cypress in which it is embosomed." (*Coleridge's Friend.*)

"Let us be careful, however, in our anxiety to escape from gloom and horror, not to run into the opposite extreme of meretricious gaudiness. Death and the grave are solemn and awful realities; they speak with a powerful and intelligible voice to the heart of every spectator, as being the common lot of all. To say nothing of the bad taste, therefore, anything obtrusively picturesque, anything savouring of fashionable prettiness, any far-fetched conceits or tortured allegories, jar upon the feelings of every well-regulated mind, and excite ideas the very opposite to those of sympathy and tenderness. Our cemeteries, then, should bear a solemn and soothing character, equally remote from fanatical gloom and conceited affectation." (*Picton*, in *Arch. Mag.* iv. p. 430.)

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* The persons living in the houses which abut on the burial-ground of Bartholomew the Less, Dr. Lynch states, are in the habit of emptying their chamber-pots into it; and the surface of the burial-ground of Bartholomew the Great, adjoining, is so covered with the excrementitious matter floated over from the cesspools of privies, that it is difficult to walk across it. There is no hope of curing any person living in this quarter, when attacked by disease, but by removal. (*Dr. Lynch*, in *Report*, &c. p. 161.)

"Where is it, would we ask," says the learned and eloquent author of *Necropolis Glasguensis*, "that the innate desire which is felt in every bosom to live in the recollection of his companions, the pleasing hope that he may still be a remembered denizen of this fleeting world, is more likely to be realised than at the spot where his ashes are laid? Where is it that the '*Extincta amabitur*,' such as Cicero professed to his daughter Tullia, and which is still the pledge of friendship offered at the couch of the dying, is more likely to be experienced in all its force and all its purity, than at the tomb where all that remains of worth and loveliness is lying? Where is it, indeed, that the heart is likely to be so feelingly moved, or the memory to be so powerfully roused, as at a parent's grave or at a sister's tomb?" (p. 27.) After deploring the present state of Scottish churchyards, and contrasting them with some in England and Wales, our author has the following touching paragraphs on the Cemetery of Père la Chaise, which, as they exhibit the *beau idéal* of what a general cemetery ought to be, in order to realise our ideas of its moral influence on the living, we shall quote as preferable to anything that we could say on the subject.

"Who, that has ever visited the romantic Cemetery of Père la Chaise, would not wish that there were, in this our native land, some more attractive spot dedicated to the reception of the dead, than those vast fields of rude stones and ruder hillocks, to which we are ever and anon called, when attending the obsequies of a kinsman or companion; that in fact there were here some such garden cemetery as that in the neighbourhood of Paris, whither the widowed heart might occasionally resort to hold spiritual communion with the departed partner of earthly joy or woe; whither the weeping orphan might at times repair, to recall the worth and the virtues of his beloved parent. Within the extensive and delightfully variegated enclosure alluded to, situated on Mount Louis, it is perhaps unnecessary to state that all the disagreeable sensations which are here coupled with a churchyard are dispelled by the beauty of the garden, the variety of its walks, by the romantic nature of its situation, and, above all, by the commanding view of Paris and its environs which it affords. In that vast grove of the dead, each has his own grave, and each his own mausoleum. In place of the clumsy mound or large white stone that so generally covers the ashes of our countrymen, is to be found a little flower-garden surrounded by cedar, spruce, cypress, and yew trees, round which the rose and the honeysuckle are seen entwining; while, instead of a solitary and deserted churchyard, the eye meets at every turn with some pensive or kneeling figure weeping over the remains of a relative, or worshipping his God at the tomb of excellence and virtue.

"The most common burial-places, and perhaps the most affecting, in this cemetery, consist of a square or parallelogram of ground, of about three or four yards broad, enclosed by a neat little railing of iron or wicker-work. Within this spot there is always a sepulchral urn, a small pillar, or a cross, to tell the name and the quality of him who lies below. The remaining portion is filled with flowers, and embellished with pots of rare plants. The more ambitious monuments consist of obelisks, pyramids, temples, and marble sarcophagi, decorated with figures and *bassi rilievi;* while a third consist of crypts and family sepulchres in some degree similar to those of ancient Rome. Amid the green glades and gloomy cypresses which surround and overshadow the vast variety of sepulchral ornaments of Père la Chaise, the contemplative mind is not only impressed with sentiments of solemn sublimity and religious awe, but with those of the most tender and heart-affecting melancholy. Vain man is recalled from the distracting turbulence and folly of the world, to the salutary recollection 'of that undiscovered country from which no traveller returns.' The gay and the giddy are reminded that their 'gibes and jokes' must ere while for ever cease, and are led to reflect that they too must die; and, as 'by the sadness of the countenance the heart is made better,' the religious man, instructed on the narrowness of the boundary which separates him from those who were the 'sun and centre' of his nearest and dearest regards on earth, looks forward not only without fear, but with joy and exultation, to the period when, that boundary being for ever broken down, they shall, in their happy experience, find that, as they were loving and beloved in their lives, 'in their deaths they were not divided.' In the mazes of Père la Chaise, we feel walking as in the porch of eternity, and our heart is at once impressed with a sense of the evanescence and the value of time. There, the instability of all human affairs is emphatically and eloquently taught by the dread silence of the tomb, and unequivocally beheld in the mere change which a few years have produced on the garden itself; for, within the stately mansion whose ruins are now on every side surrounded by melancholy tombs, did the favourite confessor of Louis XIV., the most powerful and most persecuting Jesuit of his time, erst pass his hours of pastime and of pleasure; and the disciples of Jansenius and Molina now repose, in freedom and in peace, in that place to which, when alive, they did not dare even to approach; while the fierce disputes which they mutually excited through the Christian world are fallen, like themselves, into neglect and oblivion!*

"In Scotland it is of every-day occurrence, to find the lie given to the most pompous monuments, a few months after their erection, by the moss overgrowing and obscuring the epitaph which vows and intends unceasing remembrance of the dead. In the Cemetery of Mount Louis, however, the feeling of recollection is exemplified to live a very long time after the engraving of the sepulchral stone and the wonted period prescribed to outward mourning. It is there the custom for surviving friends to visit the tombs of their relatives, and, as a token of recollection and respect to their memory, to weave a garland of flowers, and hang it on their monument. At every turn the eye is arrested by the tender proof of some late friendly visitation. Flowers, as yet fresh and unfaded, are seen scattered over the not yet verdant sod. The greenhouse myrtle flourishes in the parterre dedicated to affection and love; the chaste forget-me-not blooms over the ashes of a faithful friend; the green laurel shades the cenotaph of the hero; and the drooping willow, planted by the hand of the orphan, weeps over the grave of the parent. Every thing is there tasteful, classical, poetical, and eloquent. In that asylum of death, there is nothing found save that which should touch the heart or soothe the afflicted soul, nothing save that which should awaken tender recollections or excite religious feelings. In one word, the Cemetery of Père la Chaise is the spot, of all others, dedicated to the genius of memory; and the one where a more powerful sermon is daily preached than ever fell from the lips of a Fenelon, a Massillon, or a Bossuet. Here the bodies of the

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"* It is from this confessor, Père la Chaise, that the cemetery derives its appellation. By an edict in 1804, prohibiting burial in churches and inhabited places, the garden and pleasure-grounds of the late confessor were converted into a burial-ground, chiefly for those persons of a higher circle who could afford to purchase a grave and rear a monument; and, at this moment [1831], the whole of this extensive enclosure is nearly covered with tombs and monuments. [We have seen a Report on this cemetery, made to the French Government, dated 1842, by which it appears to be so much crowded as to require enlargement, and also that much ground has been lost in consequence of its not having been laid out originally on some systematic plan. In this Report the want of walks and roads, and of drainage, is particularly deplored, as well as the dilapidated and decaying state of the monuments.]

people of every nation, of every condition, of every age, and of every religion, are found congregated. The Russ sleeps next to the Spaniard, the Protestant next the Catholic, the Jew next the Turk. Individuals the most dissimilar when alive, in faith, in feeling, in practice, are here reconciled amid the peace-making dust of the sepulchre." (*Necropolis Glasguensis*, p. 32.)

"A garden cemetery and monumental decoration are not only beneficial to public morals, to the *improvement of manners*, but are likewise calculated to *extend virtuous and generous feelings*. Affliction, brightened by hope, ever renders man more anxious to love his neighbour. At the brink of the grave we are made most feelingly alive to the shortness and uncertainty of life, and to the danger of procrastinating towards God and man whatever it is our bounden duty to perform. There, too, the conscience is taught the value of mercy, and best feels the recompense which awaits the just in Heaven. There, the man whose heart the riches, titles, and dignities of the world have swollen with pride, best experiences the vanity of all earthly distinction, and humbles himself before the mournful shrine, where

'Precedency 's a jest; vassal and lord,
Grossly familiar, side by side consume.'

There, the son whose wayward folly may have embittered the last days of a father will, as he gazes on his grave, best receive the impulse that would urge him, as an expiation of his crime, to perform a double duty to his surviving parent. There, in fact, vice looks terrible, virtue lovely; selfishness a sin, patriotism a duty. The cemetery is, in short, the tenderest and most uncompromising monitor of man ; for,

'When self-esteem, or other's adulation,
Would cunningly persuade us we were something
Above the common level of our kind,
The grave gainsays the smooth-complexion'd flattery,
And with blunt truth acquaints us what we are.'

A garden cemetery is the sworn foe to preternatural fear and superstition. The ancients, from their minds being never polluted with the idea of a charnel-house, nor their feelings roused by the revolting emblems of mortality, contemplated death without terror, and visited its gloomy shrine without fear. With them death was tranquillity, and the only images that were associated with it, were those of peaceful repose and tender sorrow. The names of their burial-places indicate no association with terror, and call forth no feeling of fear. The *Cœmeterion* of the Greek suggests only the idea of a bed of slumber ; the *Bethaim* of the Jew speaks but of the mansion of the living. Amid the tombstonės of Thermopylæ, we would conceive that the Grecian heart beat no less boldly at midnight than at mid-day ; while we know that the timid female, during the slumber of Jerusalem, could fearlessly wander to the silent sepulchre.* Whence then did the preternatural terrors connected with death arise, which so powerfully swayed the hearts of the middle and more modern

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"* Among the works of ancient art there is not to be found a single image of a revolting nature connected with death. D'Israeli states that, 'to conceal its deformity to the eye, as well as to elude its suggestion to the mind, seems to have been a universal feeling; and it accorded with a fundamental principle of ancient art, that of never offering to the eye a distortion of form in the violence of passion which destroyed the beauty of its representation; such is shown in the Laocoon, where the mouth only opens sufficiently to indicate the suppressed agony of superior humanity, without expressing the loud cry of vulgar suffering.'

ages; those slavish terrors which, in the ages of ignorance, appeared almost to make the resurrection an unhoped for, rather than a hoped for, event; terrors altogether at antipodes to those just fears that call upon man, ere death, to make up his peace with Heaven? This slavish and more than vulgar error was chiefly engendered through the monkish artifice of associating man's latter end with all that was disgusting and horrible, and of inspiring the world with the idea, that, to gain heaven, it was not necessary to exist rationally on earth. Amid the general gloom thus created by penances and pilgrimages, by midnight masses and bloody flagellations, the troubled imaginations of Europe, as D'Israeli says, 'first beheld the grave yawn, and death, in the Gothic form of a gaunt anatomy, parading through the universe. The people were affrighted as they viewed every where hung before their eyes, in the twilight of their cathedrals and their pale cloisters, the most revolting emblems of death. Their barbarous taste perceived no absurdity in giving action to a heap of dry bones, which could only keep together in a state of immovability and repose; nor that it was burlesquing the awful idea of the resurrection, by exhibiting the incorruptible spirit under the unnatural and ludicrous figure of mortality, drawn out of the corruption of the grave.' If supernatural terror sprang from such causes, it was from the gloomy, naked, and deserted cemetery that superstition drew her chief influence. Thence flitted the phantoms which terrified the vulgar, and which even carried dread to the thrones of kings and emperors. Solitude peopled itself with ghosts and spectres; silence disturbed itself with hollow groans; while Nature, reversing her laws, allowed the dead to collect their scattered mouldering bones, and to appear, at the witching hour of night, wrapt in a winding-sheet. The monsters which man's imagination thus created, he turned from with horror; they broke his rest in the silence of the winter's night; he heard their cry in the howl of the winds, their threat in the roar of the tempest. If the corrupters of Christianity still attempt to terrify rather than to console humanity, and if superstition still exercises her fatal spell, does it not become the duty of every wellwisher to his species, to pour into the tomb the light of religion and philosophy, and thereby to dissipate the vain phantoms which the false gloom of the grave has tended to call forth. The decoration of the cemetery is a mean peculiarly calculated to produce these effects. Beneath the shade of a spreading tree, amid the fragrance of the balmy flower, surrounded on every hand with the noble works of art, the imagination is robbed of its gloomy horrors, the wildest fancy is freed from its debasing fears. Adorn the sepulchre, and the frightful visions which visit the midnight pillow will disappear; and if a detestation for annihilation, mingled with the fondest affection for those who are departed, should lead men still to believe that the dead hold communion with the living, the delightful illusions which will result from this state of things will form a pleasing contrast to the vile superstitions that preceded them. Let the fancied voice of a father pierce, in the silence of the night, the ear of the son who lives unmindful of his parent's early counsels; or let the shade of a warning mother appear in the lunar ray, to the thoughtless and giddy eye of her who threatens to sacrifice her beauty and her virtue at the shrine of flattery. These fancies, the children of a pious sorrow, will neither debase the human mind, nor check the generous impulses of the human heart." (*Necropolis Glasguensis*, p. 62.)

The remaining point to be noticed is, the influence which a cemetery or a churchyard is calculated to have in *improving the taste*. That churchyards have had very little influence of this kind hitherto, we readily acknowledge; but that they are calculated to have a great deal, may be argued from the universality of churches and burying-grounds, and from their being visited by every individual perhaps more frequently than any other scene, except that of his daily occupation. A church and churchyard in the country, or a general cemetery in the neighbourhood of a town, properly designed, laid out, ornamented with tombs, planted with trees, shrubs, and herbaceous plants, all named, and the whole properly kept, might become a school of instruction in architecture, sculpture, landscape-gardening, arboriculture, botany, and in those important parts of general gardening, neatness, order, and high keeping. Some of the new London cemeteries might be referred to as answering in some degree these various purposes, and more particularly the Abney Park Cemetery; which contains a grand entrance in Egyptian architecture; a handsome Gothic chapel; a number, daily increasing, of sculptural monuments; and one of the most complete arboretums in the neighbourhood of London, all the trees and shrubs being named. In summer there are a number of beds filled with flowers of various kinds, and the whole is kept with great neatness and order. We do not, however, approve of various points in the arrangement of the trees and shrubs in this cemetery, nor of the form of the beds containing the flowers, though we admit that the management in these particulars is better than it is in most of the other cemeteries. But this subject will be considered more in detail in division VII.

Churchyards and cemeteries are scenes not only calculated to improve the morals and the taste, and by their botanical riches to cultivate the intellect, but they serve as *historical records*. This is the case with the religious temples and burial-grounds, in all ages and in all countries. The country churchyard was formerly the country labourer's only library, and to it was limited his knowledge of history, chronology, and biography; every grave was to him a page, and every head-stone or tomb a picture or an engraving. With the progress of education and refinement, this part of the uses of churchyards is not superseded, but only extended and improved. It is still to the poor man a local history and biography, though the means of more extended knowledge are now amply furnished by the diffusion of cheap publications, which will at no distant time, it is to be hoped, be rendered still more effective by the establishment of a system of national education. "A garden cemetery and monumental decoration," our eloquent author observes, "afford the most convincing tokens of a nation's progress in civilisation and in the arts which are its result. We have seen with what pains the most celebrated nations of which history speaks have adorned their places of sepulture, and it is from their funereal monuments that we gather much that is known of their civil progress and of their advancement in taste. Is not the story of Egypt written on its pyramids, and is not the chronology of Arabia pictured on its tombs? Is it not on the funeral relics of Greece and Rome that we behold those elegant images of repose and tender sorrow with which they so happily invested the idea of death? Is it not on the urns and sarcophagi of Etruria that the lover of the noble art of sculpture still gazes with delight? And is it not amid the catacombs, the crypts, and the calvaries of Italy, that the sculptor and the painter of the dark ages chiefly present the most splendid specimens of their chisel and their pencil? In modern days, also, has it not been at the shrine of death that the highest efforts of the Michael Angelos, the Canovas, the Thorwaldsens, and the Chantreys, have been elicited and exhibited? The tomb has, in fact, been the great chronicler of taste throughout the world. In the East, from the hoary pyramid to the modern Arab's grave; in Europe, from the rude tomb of the druid to the marble mausoleum of the monarch; in America, from the grove which the Indian chief planted round the sepulchre of his son, to the monument which announces to the lovers of freedom the last resting-place of Washington." (*Necropolis Glasguensis*, p. 63.)

Such are the various important uses of the cemetery and the churchyard, which it was necessary to take into consideration, before devising either a design for laying out a cemetery, or a system of rules and regulations for its working and management.

(*To be continued.*)

ART. II. *Dinbur Castle, its Gardens and its Gardeners.* By PETER MACKENZIE.

(*Continued from our preceding Volume*, p. 610.)

ON the north side of the garden there was a small glen; the side next the garden was steep and rocky, the opposite side was sloped and of more easy access; here and there lay large blocks of whinstone rock, and the vegetation consisted chiefly of whins and broom. Near this place were some of the labourers' cottages, which could easily be seen from the bothy; and there was a footpath across the small ravine, which led from the one place to the other. Bauldy Black was well acquainted with the path, and could find his way in the dark, although it required the assistance of the loose roots and the broom to help one along.

That night he was often looked for by Maggy Scraunky; for she heard that he was going to the dance, and she was anxious to know whom he was to have for a partner. As she was looking at one time towards the bothy she was surprised to see a bright light come from the bothy window; a flash of lightning, as she thought. She kept looking in the same direction for some time, when another illumination took place. She instantly turned away, and ran into one of the houses, exclaiming: "There is something no canny about the garden this night; only come out and ye'll see. There is surely something wrang wi' Bauldy." — "What can be wrang wi' Bauldy, mair than ony o' the rest?" said Geordie Lowrie: "he was hale and weel when I cam frae my wark in the gloamin." However, old and young ran to the door, and all eyes were directed to the bothy, when soon another flash was seen brighter than any that had yet appeared. "See ye that?" roared out Meg: "ye'll ken noo gif I hae been haivering to ye."

"That is an unchancy blink," said Geordie, "and unco uncanny like. My granny has often tauld me about warlocks and witches, and brownies and fairies, and kelpies and spunkies, but ony thing like that I hae never seen. I mind fu weel, on a night when I gaed awa to see Jenny, a pick mirk night it was; and coming near the cairny loan I saw a blue low dancing atween the hedges, and coming in my direction. Though I was a raukle handit chield then, I was unco eerie, and felt a groozzling in my throat, and a smell o' brimstone; and if I hadna set a tryst wi' Jenny, it wouldna been that night I would hae gane to the hethery knowe; and I tried to gang faster, but it turned the corner before me. I begun to feel gif the bonnet was on my head, for I thought a' my hair stiffened; and it still gaed dancing before me, but I followed slowly behind it. Sometimes it went faster than I was able to follow, at last it took a turn awa to the auld kirkyard of Mirkness, which was near by. When I entered Jenny's father's house I nearly fainted. — 'What's wrang wi' ye the night, Geordie lad, ye are no yersel ava?' — 'Come awa to the door, and ye'll see something that will maybe mak ye wonder. Do ye see yon blue low dancing in the corner of the kirkyard?' — 'That's nae ferlie," said the auld carle; "whar did it come frae?' — 'It cam frae the clauchan airt, and up the cairny loan.' — 'Weel, weel, there will be a funeral in a few days come the same gate, and if ye wait awee ye will see it gang awa the road it cam.' And I stood upon a knowe and saw it gang awa again, and in three days after the auld miller o' Melderston was brought to his lang hame."

Geordie was beginning another spunkie story when another brilliant light was seen, and he cried out: "Come awa, bodies, come awa, we are lang enough here; there will be waur news than piper's news heard o' ere long. We will, maybe, soon hae to read Bauldy's epitaph, puir chield, for he deserves ane as weel as Habbie Simson the piper o' Kilbarchan, or anither fiddler, whose name I forget, but it is said of him: —

'Here lies dear John, whose pipe and drone,
  And fiddle oft has made us glad;
Whose cheerfu' face our feasts did grace,
  A sweet and merry lad.'"

Next morning the young men were greatly amused by the remarks Geordie Lowrie made concerning the "awfu' lights he had seen coming frae the bothy yestreen." They, however, took care, the next time that Sandy Macalpine made chemical experiments, to hang up one of their aprons over the window, to prevent any of their neighbours imagining that they were raising the devil.

In a few nights after Sandy Macalpine had delivered his remarks on oxygen, Walter Glenesk was prepared to give a short outline of geology, a branch of knowledge which he thought every gardener ought to be acquainted with. It was well, he said, to be acquainted with mathematical, physical, and political geography, to know the general form of the earth, and be able to determine the relative positions of places upon the earth's surface; also to know something about the principal features of the surface of our globe, to have some knowledge of the mountain ranges of Europe, Asia, Africa, and America, as well as of the valleys and plains of these extensive districts; to be acquainted with the subject of climate and temperature, and how these and other natural causes affected the condition of the human race; also with the moral and social condition of the various nations of the world. All these were subjects well worth the study of man: but, however varied and beautiful the exterior features of the earth may be, together with the herbs and trees that adorn it, and the numerous tribes of organised beings which people it, yet the interior structure of our earth deserves also our particular attention; for it could be easily shown how close a relation exists between rocks and soils, and how a knowledge of the nature of soils must be of essential benefit to those who cultivate them; every gardener, therefore, ought to be a geologist.

Walter Glenesk took his own way to illustrate his subject. When travelling from place to place, he made himself, as far as he was able, familiar with the geological features of the country through which he passed, and when he had settled he collected specimens of the rocks and erratic boulders which he found in the neighbourhood of the place in which he resided, so he was enabled to make his discourse more interesting, by exhibiting specimens of many of the rocks that form part of the different geological formations. The other lads in the bothy were able to examine the specimens at their leisure, which was an advantage which many students who attend geological lectures do not enjoy. He had prepared an ideal section of part of the earth's crust on a large scale, by means of which he was able to point out more clearly the relation which one rock bears to another.

He commenced with granite, a rock considered as occupying the lowest part of the series, and often found in mountain ranges at the highest elevation. He did not stop to tell them of its constituent parts, but went on from granite to gneiss, from gneiss to mica-slate, from that to chlorite-slate, talc-slate, hornblende-slate, clay-slate, primary limestone, quartz rocks, and serpentine rocks. Having gone over the various rocks of the primary formation several times, until the others could name them in their order, he then proceeded in describing the constituent parts of granite. He told them that it was composed of felspar, quartz, mica, and sometimes hornblende, but they were not to imagine that these were simple substances; and, taking up a specimen of felspar, he told them that it was composed of potash, silica, and alumina; mica contained potash, silica, alumina, magnesia, and iron; hornblende was composed of silica, lime, iron, and magnesia; and quartz, when pure, consisted of silica alone. He then showed them the difference between the best Aberdeen granite and that of Peterhead and Braemar: how it varied in colour; sometimes it was flesh-coloured, at other times dark grey: how some kinds of it were indestructible, and others were easily decomposed by means of the air and water acting upon the potash of the felspar. The celebrated Cornish clay, much used in potteries, is obtained from decomposed granite; and sometimes, when the clay is mixed with the quartz of the granite, a tolerably good soil is produced sufficient to bear corn crops when properly cultivated and manured.

From granite he proceeded to gneiss, and showed them the difference between the two rocks, although composed of nearly the same sort of materials, namely, felspar, quartz, mica, and hornblende; pointed out to them how granite was granular, and gneiss was granular and slaty; and how that a great part of the Highlands of Scotland is composed of strata of gneiss, and that vegetation, in those districts where gneiss abounds, is generally thought to be more productive than where granite abounds. He next showed them specimens of mica-slate, telling them that they were composed chiefly of mica and quartz, and that Ben-Lomond, Ben-Ledi, and other parts of the Grampian Mountains, were mostly composed of it. He showed them two varieties of it; one abounding with garnets, the other without them. Next followed specimens of clay-slate from various slate quarries in Scotland, such as Aberfoil, Callender, and other places where roofing slate is found; in some slates iron pyrites abound, others are without them. On the banks of Loch-Lomond it may be seen dipping into the water, and rising again on each side of the loch; and may be compared to "a bonnie blue ribbon" thrown across the breast of the Grampians.

Next followed primary limestone, quartz rock, and serpentine. Primary limestone, he told them, was sometimes called statuary marble, and that some beautiful specimens of it were found in the North of Scotland. It is of a granular and crystalline texture, and some kinds of it take a very fine polish. Much of the marble that was used by the ancients was obtained from Mount Pentelicus in Attica, and also from the Island of Paros, as well as from Mount Hymettus, Lesbos, and other places; and much that is used by the moderns is obtained from the quarries of Carrara. Quartz, he told them, was also found in the primary formation, and there were many varieties of it. The Cairngorm stone, or rock crystal, is one variety of it; and the common, or amorphous, quartz is another. He also showed them some beautiful varieties of serpentine rock from Portsoy; a rock composed chiefly of magnesia, silica, and iron. After making them acquainted with the order of superposition of the rocks of the primary formation, and also pointing out the character of each, he proceeded to inform them that many of the metals were found in veins in the rocks belonging to the formation they had just been considering; and the richest mines in Cornwall, where copper and tin ores were obtained, were in the primary clay-slate resting on granite; also the mine of Valenciana, at one time the richest in Mexico, where gold and silver were obtained, traversed the clay-slate and porphyry.

Before proceeding to the transition series of rocks, he gave the young men an opportunity for making any observation they thought proper on the subject they had been hearing.

Bauldy Black was the first man that made any remarks. He said that he had listened wi' a' the attention he was able to give, and he thought he understood the subject as far as he had gane, for he once had some dealings wi' stanes. When he was a laddie on the farm o' Rashenbrae, mony a cart-load had he broken to fill drains wi'; but he never had heard so much said about rocks and stones before, nor did he ken that they had sae mony braw names before. "What ye ca' granite, we used to ca' it a ringer; and mica was sheep's siller; and quartz was liverwhin, and chucky stanes. But, Watty, is that no the diamond that is found in slates which you name pyrites? When I was herding, often hae I broken the slates for them; and large anes were sometimes found in a kind of slaty whinstone." Walter told him that the true diamond was quite a different substance altogether; that it was found in Bengal and the Island of Borneo, and also in Brazil and other places; and that it was found to be crystalline charcoal, while those yellow bodies that were obtained from roofing slate were composed chiefly of iron and sulphur. But it would appear that every country must have its diamonds, and almost every formation is sought for them; the Scotch seek for them in the primary formation, and the English in the gravelly hills of Bagshot Heath.

"But what kind of a stane is that," said Bauldy, "that ye have amang your specimens of primary rocks? I think I hae seen something like it sometimes turned up by the plough, and a hard heavy lump it is; there's nae braken o't; ye may maist as weel thump awa at a yetlin bullet; and I ance saw a sma' bit of it draw the needle of a compass to it, and make it spin round like Jenny Birril's wheel o' fortune on the end o' an auld herrin barrel at Broxbrae fair."—"That is magnetic iron-stone," said Walter; "and it is frequently found in primary mountains. It is also found in the Shetlands, and many parts of Germany and Sweden."—"And how had it found its way to the Rashenbrae?" said Bauldy.—"That is a subject which we will not enter upon at present," said Walter; "but, perhaps, we will be able to give you information on that point when we are farther advanced in geology."

West Plean, December 10. 1824.

ART. III. *Bicton Gardens, their Culture and Management. In a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 52.)

LETTER X. *The Rockery. The American Garden.*

I WILL now, according to my promise, give you a short description, and the circumference of a few of the finest specimens of trees and shrubs in the American Garden and Rockery. The Rockery is covered with a collection of plants far too great for me to enumerate at present. Amongst them are fine specimens of many kinds of ferns, berberis, and ribes, of Cunninghàm*ia* sinénsis, &c. There is a constant supply of water coming out of the top of a pyramid of rocks in the centre of the rockwork, and trickling down the sides of it, thus forming a "weeping pillar;" and there are pipes and stopcocks in various parts of the Rockery, so that you have merely to turn them, to water the whole of it at once.

The American Garden, adjoining the Rockery, has a lovely stream of clear water running through it, over a bed of the beautiful round pebbles for which our sea-coast is celebrated. In this stream you see trout of different sizes enjoying themselves unmolested. This is the most delightful part of the garden from April to July, with its rich collection of the rarest rhododendrons, consisting of fine plants of the following, viz.: —

- *R.* campanulàtum, and the hybrid varieties.
    - Victòri*æ*
    - Cunninghami*ànum*
    - nepalénse
    - Glenny*ànum*
    - venústum
    - stríctum
- arbòreum
    - *r*òseum
    - rubicúndum
    - álbum
    - Webb*iànum*
    - acutifòlium
    - supérbum
    - coccíneum
    - altaclerénse
- príncep
- macránthum
- tigrìnum
- tig. grandiflòrum
- Lee's purple
- daùricum altàicum
    - atrovìrens
- punctàtum
- *m*yrtifòlium
- chrysánthum
- caucásicum
- pulchérrimum
- Noble*ànum*
- Russell*iànum*
- *p*runifòlium
- Rollissòn*ii*
- Smíth*ii*
- magnoli*æfòlium*
- máximum grandiflòrum
    - mirábile
- catawbiénse
    - spléndens
- frágrans, and many others.

Clumps of the richest and handsomest Ghent and other azaleas.

Likewise clumps or beds of Andrómed*a*, Lyòn*ia*, large plants of Leucóthoe floribúnda; arbutus of sorts, pernettyas, clethras;

kalmias, noble clumps; ledums, vacciniums; cistuses, many varieties; helianthemums, all of these in fine clumps, of which it would fill a large book to give the names of all the varieties; *V*ibúrnum *O*ˊpulus *r*òsea; Stuárt*ia* marylándica, syn. Malachodéndron marylándicum.

Name.	Height.		Circumf.	
	Ft.	In.	Ft.	In.
*C*ratæˋgus				
Douglàsii - -	12	0	42	0
macracántha -	10	0	38	0
Crús-gálli ovalifòlia	11	0	19	0
ovalifòlia	14	0	42	0
obtusifòlia -	11	0	35	0
salicifòlia	5	6	56	0
spléndens -	14	0	40	0
punctàta - -	13	0	39	0
orientàlis - -	10	0	48	0
sanguínea	14	0	48	0
tanacetifòlia -	18	0		
tanacetifòlia -	11	0	21	0
*p*yrifòlia (edùlis *Lod. Cat.*) -	10	0	14	0
*p*yrifòlia - -	12	0	40	0
glandulòsa - -	7	0	18	0
*a*piifòlia - -	10	0	39	0
coccínea - -	12	6	38	0
*p*runifòlia - -	11	0	32	0
*p*yracanthæfòlia -	8	0		
nígra - - -	16	0	27	0
lobàta - -	15	0	29	0
cordàta - -	17	0		
*O*xyacántha melanocárpa				
eriocárpa				
laciniàta				
obtusàta				
parvifòlia				
mexicàna				
andmany others.				
*M*éspilus grandiflòra	14	0	40	0
Photínia serrulàta (*C*ratæˋgus glàbra *Lod.*) - - -	15	0		
Gledítsch*ia* hórrida -	12	0	24	0
Amelánchier Botryàpium				
*L*igústrum chinénse				
*A*mýgdalus nàna				
*L*aúrus *Benzòin*				
*A*ˋcer créticum				
*E*læágnus horténsis latifòlia - -	15	0	36	0
Andrómed*a* acuminàta - - -	6	0	38	0
Chimonánthus fràgrans - - -	6	0	20	0
*A*càcia dealbàta -	20	0	38	0
*C*ércis canadénsis -	6	0	22	0
*S*iliquástrum -	10	0	40	0
*O*ˋlea europæˋa var. *b*uxifòlia - -	5	6	10	0
Cedronélla triphýlla	12	0		
*O*thónna crassifòlia -	10	0		
Ozothámnus *r*osmarinifòlius - -	10	0		
Coronílla glaúca -	10	0		
*C*eanòthus azùreus -	13	0		
The five last named cover a large space of wall.				
Salisbùr*ia* *a*diantifòlia - -	10	0		
Calycánthus flóridus lævigàtus - large				
*C*ýtisus sessilifòlius -	8	0	18	0
Bérberis asiática -	16	0	39	0
Large plants of				
Magnòl*ia* acuminàta	11	0	18	0
obovàta				
grandiflòra				
exoniénsis				
latifòlia				
angustifòlia				
lanceolàta				
macrophýlla				
tripétala				
fuscàta				
pyramidàta				
auriculàta				
conspícua				
Soulang*iàna* -	10	0	27	0
purpùrea				
glaúca				
Thomson*iàna* -	10	6	24	0
grácilis				
cordàta				
*A*ˋbies Smith*iàna*				
canadénsis				
Pàv*ia* díscolor				
*U*ˋlex europæˋa flòre plèno				
Cotoneáster micro-	5	0	18	0
phýlla - -	14	0	24	0
Ailántus glandulòsa -				

All the magnolias are good plants. Several varieties of escallonias, myrtles, daphnes, fine specimens of Andrómeda floribúnda, and many other fine and rare plants. A very lofty tree of *P*ópulus (álba var.) canéscens: the trunk, at 4 ft. from the ground, is 22 ft. 6 in. in circumference; and it is 42 ft. to the first branch, and then about 54 ft. above the first branch; therefore, the whole height is about 96 ft. The large beech tree in the flower-garden you took great notice of, and wished for the dimensions. The trunk, 4 ft. from the ground, is 12 ft. 6 in. in circumference, clear trunk, 38 ft. to the first branch; the tree altogether is about 78 ft. high. There was another beech tree exactly similar to the one I have described, which stood in the corresponding situation in the flower-garden, but was blown down about four years ago, and in its fall did much damage to the Maltese vases, &c.

Bicton Gardens, Oct. 22. 1842.

LETTER XI. *The Trees in the Park. The Lake, and the Aquatic Birds.*

I WILL now give you the dimensions of a few of the noble trees that are growing in Bicton Park. Taking them altogether, I think I never saw so fine a lot of trees growing on the same space of ground. Some of the brave old oaks measure, at 4 ft. from the ground, 17 ft. to 18 ft. in circumference, and many of them spread their branches round to an immense distance. Several elms, about the same size in circumference, from 86 ft. to 100 ft. high. Remarkably fine beeches from 84 ft. to 96 ft. high; at 4 ft. from the ground, measuring from 13 ft. to 19 ft. in circumference. A good specimen of a Lucombe oak, 68 ft. high, the circumference of which is 8 ft. 6 in. The largest ash I ever saw, measuring 85 ft. high, 12 ft. in circumference, and going up in a straight line 30 ft. to the first branch. There are many fine specimens of chestnuts, limes, &c.; indeed, the trees of all kinds thrive very well here.

There is in the park a beautiful lake with islands, on which is a fine collection of black and white swans, and all kinds of aquatic birds and fowls; and in the winter it is covered with wild fowls of all sorts, which are never permitted to be shot.

Bicton Gardens, Oct. 29. 1842.

ART. IV. *On Bottom Heat.* By R. ERRINGTON.

THE subject of bottom heat has been much canvassed of late, but still it is a thing of indefinite character, and not, in my opinion, appreciated according to its merits. Dr. Lindley, in his excellent work, *The Theory of Horticulture*, has, in a pointed and philosophical manner, endeavoured to draw attention to the subject. However, we want data to proceed upon; the vegetation year, or active period, is not confined by Nature to any given months, but moves by periodical fits. Those fits (a clumsy term, I confess,) are dependent chiefly on the relation that the bottom heat bears to that of the atmosphere.

I am of opinion that the average bottom heat of certain periods is much more in advance of the average of the atmosphere, at the same period, than is commonly imagined. I know it is common to say that the average bottom heat of the year is about 2 or 3 degrees in advance of the average atmospheric temperature; but this, if correct, proves nothing, except that bottom heat is one of Nature's established principles.

To obtain the data requisite, the year should be divided into natural periods: one of these is obviously the rest period; a second points itself out as the excitable period; and a third as the perfecting or accumulating period. Now, it is not proper, I conceive, to plunge a thermometer 1 or 2 feet deep to ascertain how vegetation is influenced by bottom heat, seeing that the chief and most efficient volume of roots lies probably within from 6 in. to 9 in. of the surface. The radiation, too, from the surface may also be taken into consideration; as the accumulation of heat by the end of August must be very considerable, especially within 3 in. of the surface.

The time was when bottom heat was only deemed essential for pines and cucumbers; but now few processes of any importance are conducted under glass without it.

Many complain that they cannot get their greenhouse and conservatory as gay through the months of December, January, and February, as they could wish; and I do not wonder at it. If plants in a somewhat dormant state are to be subjected to a higher temperature all of a sudden, without activity of root, what can be expected but abortions?

I am led to make these remarks in consequence of observing the effect of bottom heat in flower-forcing in general, more especially Dutch bulbs. Mine have been unusually early and good; and I adopt a practice which deserves to be more generally known. My hyacinths, narcissuses, &c., are potted at the usual time and in the usual way, and immediately plunged over head in old tan. This so far is every body's plan; but about the end of October I take them up, and prepare a bottom heat of from 75° to 80° of dung and leaves, between the bricked asparagus pits, and place the pots thereon, covering them as before with old tan. When this heat declines, I prepare the next pit in like way, and remove them into it; keeping them, in fact, in a similar bottom heat constantly. By these means I get my root in advance of the bud; for, this season, having paid close attention to their movements, I found the pots were full of roots, and well coiled round the bottoms of the pots, before the buds were an inch long. This I conceive to be a point of high importance; for on removing them from the asparagus pits to a forcing-pit of dung and leaves, where the bottom heat was 80°, and the top heat averaging 65°, the buds came up like magic, and were in bloom in a surprisingly short period.

The same principle applies to nearly all of what are termed forcing flowers; not excepting strawberries, which, in my opinion, would be much benefited by such a process. However, I have not yet proved this with strawberries, although I have several experiments in progress, bearing on the subject of bottom heat, which I shall probably make known as soon as completed.

When the various flowers possessing capabilities for forcing are taken into consideration, we may fairly conclude that our conservatories and greenhouses ought to be as gay in the month of January as during any part of summer, and so, in fact, have mine been; for I have had abundance of camellias constantly from the first of November (some thousands of blossoms), violets, lilies, azaleas, bulbs, justicias, lilacs, eranthemums, and scarlet geraniums, in great profusion, now, indeed, a complete blaze of colour.

Oulton Park, near Tarporley, Jan. 20. 1843.

Art. V. *On pulverising Soil.* By John Wighton.

Though it is certain that nothing is created without some specific purpose, a man may be tempted to ask, What can be the use of weeds, seeing that they encumber the ground, and choke up the crops? The labourer, more industrious than learned, may imagine that weeds are sent to afford him employment in rooting them out; and he may not be altogether wrong, though he does not carry his view far enough. The advantage does not end here; for, in the act of hoeing the weeds, the soil is pulverised, and thereby encouragement given to the growth of the crops. But for the necessity of hoeing up weeds, this important process of stirring and breaking up the soil would be, it is to be feared, much neglected. However, since the days of Tull, the benefit of pulverising the soil is better understood; and, though many plans of that great agriculturist were ridiculed in his day, they are now in common use. He tells us that it is of more consequence to stir the soil than to manure it, in short, that if the former be practised, manure will not be wanted; and that hoeing ought to be done at all times, instead of weeding. It is useless for me to comment on the first; and hoeing is not at all times practicable. Weeds will not die in wet weather; and it is injurious to tread upon the land at that time. Hoeing, moreover, is hurtful to some crops in very dry weather, from letting too much moisture escape, notwithstanding the opinion of Tull. A proof of this is the fact that the best onions often grow on the hard paths between the beds. The reason is obvious; the firm soil retains moisture longer than that which is loose. This circumstance led to the practice of treading down onion-beds fresh sown, as also of pressing down dry earth in which fine seeds are sown.

I have said enough above to obviate the supposition that I am opposed to hoeing or stirring the soil. Mr. Barnes, too, has noticed its great utility in the November Number of this Magazine, for which its readers are much indebted to him. He justly observes that gardeners have many kinds of blights to contend against, without the injury caused by handling the fruit, as servants are too much in the habit of doing, before it reaches the master's table. This, however, is irrelevant to the subject before us. In justice to Tull, I will give his words on the subject of hoeing in dry weather, at p. 27, 28.: — "Dews moisten the land when fine. Dig a hole in the hard dry ground, in the driest weather, as deep as the plough ought to reach; beat the earth very fine, fill the hole therewith, and, after a few nights' dews, you will find this fine earth become moist at bottom, and the hard ground all round become dry." From this he observes: "In the driest weather, good hoeing procures moisture to the roots; though the ignorant and incurious fancy it lets in the drought, and therefore are afraid to hoe their plants at such a time." Although Cuthbert W. Johnston calls these enlightened observations, they are not very clear. Though it is said that vapour is absorbed by the soil, Tull's experiment does not prove it; for, if such were the fact, the soil would have been wet at the top instead of the bottom. The truth is, that the hole was a vent for the vapours to ascend from below. Upon this Tull might safely have founded his belief, that hoeing in dry weather gives moisture to the roots of young plants; but there is danger, on the other hand, of letting too much escape. Young turnip plants can, perhaps, stand drought better than wet cold weather. This appeared by the bad crops on good land which retained moisture, and the good crops on poor land which did not, in Norfolk, in the year 1841. As to the earth's absorbing vapour, it is not apparent in this case. I may be wrong here; but I can safely say that the evaporation from the earth is far greater than any absorption by it. To illustrate this, there is no need of enquiry into the theory and phenomena of dews; it is enough to make the simple experiment of covering part of a seed-bed with a mat. The under side of the mat will be found wet, while the upper will remain dry, like the exposed surface of the bed. Tull did not imagine, like some in these days, that plants derive the chief, if not the whole, of their nourishment from the atmosphere.* They are thus nourished in great measure; but, unless they are supported also from the soil by means of their roots, what they obtain from the air will be of no avail. Vegetables, in this respect, are like animals; and if any one were to try the experiment on himself, whether he could live upon air alone, he would find out his mistake sooner than Tull discovered that pulverising the soil would not enable him to dispense with manure. I may observe that Mr. Bick's alleged discovery of the cultivation of the ground without the aid of manure will, in the end, prove like Tull's.

The effect of manure on soil is pretty well understood; but not so how land becomes exhausted by a series of crops of the same kind, so that its lost powers cannot be renewed by manuring. It is a common opinion that each kind of plant draws something from the soil peculiar to itself. Of course this cannot be meant of all the 44,000 kinds already discovered. But, if it be supposed that only a few species act on the soil in this manner, we may still ask how it happens that natural forests are never exhausted. The soil continues good, though it rears a series of trees of the same kind from generation to generation. This fertility may be owing to the annual decay of the leaves, twigs, &c., which fall from the trees, and are mixed up finally with the soil. If it were practical to allow the annual decaying crops to do so, I question if the soil would become exhausted. That there are now wastes, even in this country, which were once covered with trees, does not invalidate my statement. I have not, indeed, sufficient evidence to decide how they became what they now are; but sufficient proof exists that the trees fell in full vigour. Even the oak seems to have been once flourishing in the North of Scotland: the root end of one, 6 ft. in circumference, found on the summit of Corryarrack, in Inverness-shire, is evidence of this; and the thriving growth of young plantations in such parts is convincing proof that there is no fault in the soil. I may instance those of Lord Methven on Methven Muir.

This may be supposed to fall in with the opinion, that nothing but rest can restore the lost energies of the soil. Certainly those wastes have been long at rest; but a state of rest may be understood in two different ways. Soil may be said to rest, in one sense, when no crop is upon it, and the soil is pulverised and left fallow; in another, when not disturbed, but left to the natural growth of grass. By the first, it is asserted that "fresh alkalies are set free from the rock." This may be correct; but it cannot be truly said of the second state of rest, in which the soil is not exposed to atmospheric action and influence. Nevertheless, this latter plan is often practised with great success; and this has probably led to the mixing of the turf, or rather the top spit or sod, from pasture land, with exhausted soil, in preference to all other kinds of manure.

Cossey Hall Gardens, near Norwich, Feb. 8. 1843.

ART. VI. *Notice of a Snow-Plough for Walks and Footpaths.* By JOHN LAMB.

As I do not recollect having seen, in any of your works on gardening, a snow-plough for walks or footpaths, I beg to give a description of one (*fig.* 12.) made here during the present snow, which answers well. It is simple in its construction, expeditiously and easily worked, and prevents the common evi of sweeping the gravel off the walks along with the snow.

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* Liebig mentions that a large proportion of the solid matter of plants is derived from the atmosphere.

The one under description was made from rude materials which happened to be at hand, as follows. Two pieces of board, about 2 ft. long, and 8 in. wide, were nailed together, as if to form the end and side of a box; a common road-scraper, *made of wood*, was then put in between the boards in the form of a triangle, or something like an arrow head; elevating the end of the handle so as to enable the operator to walk erect; then the boards were nailed to each end of the head of the scraper, and the implement was complete.

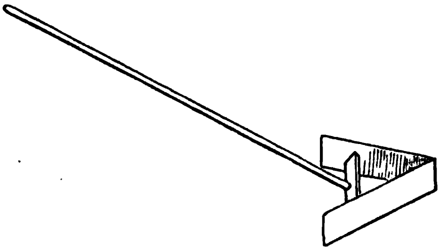

Fig. 12. *Snow-Plough for Walks and Footpaths.*

I need not mention that it is pushed before the person using it, at a walking pace; nor add that it works easier when used before the snow becomes encrusted at top.

Markeaton Gardens, Derby, Jan. 1843.

ART. VII. *On the Squirrel.* By J. WIGHTON.

THE squirrel is one of the liveliest little quadrupeds we have; whether seen leaping from branch to branch, or on the ground, he is always engaging. It is said that this little fellow lays up store for winter. I doubt this; though he may hoard up a few nuts or acorns, that can hardly be called a provision for winter, for, if he had nothing else to depend upon, he would soon fall short. By instinct, however, he inhabits woods that afford him ample supply in winter. The seed in the fir cones are his favourite food, and in summer the young shoots of the same kind of trees, especially the spruce firs; and frequently much damage is done to the trees by losing their tops by those nimble fellows. Mr. Munro has noticed this so clearly in the Vol. for 1841, p. 335., in reply to a letter of Mr. Waterton's in the Vol. for 1842, p. 203., that I think that gentleman cannot deny "the misdeeds of his favourite pets the squirrels." As the summer advances the shoots of trees get too hard for the squirrels: they then visit the orchard and garden in search of food. Their thefts in the former may be looked over, except there are nut-bushes, but not in the latter; for apricots that have escaped the frost, the grub, and decay at stoning-time, are too valuable to be carried over the wall to be eaten on the top of an adjoining tree: but the mischief does not end here, for the net that preserves cherries from blackbirds and thrushes is of little consequence to the squirrel's sharp teeth; and, if not protected in time by trap or gun, there will be nothing left of a fruitful crop except stalks and cherry stones. In justice, however, to the squirrel, I ought to mention that those misdeeds of his only happen when he is driven by necessity from the woods; and, except at nutting-time, he seldom approaches the garden; but "the damage he does then is incalculable."

Mr. Waterton laughs at the idea of Mr. Coward's belief of the carnivorou propensities of the squirrel; once I did so myself; but, after hearing of so many instances of squirrels being seen with birds in their mouths, I began to think the contrary: to test the thing, I gave a squirrel a dead swallow, and he soon devoured it. I repeated this with other birds, and the same thing always happened. Mr. Waterton can hardly object to what I have just stated, as he did to Mr. Coward, viz. "You cannot judge of the real habits of an animal when it is in confinement;" for the squirrel in question was but a few days before a free denizen of the wood, and was well supplied with his favourite kind of food at the time he eat the birds. This squirrel soon got tame; also a female, which brought forth three young ones. This gave me an opportunity of observing their habits when young. At first they were helpless ugly creatures, blind four weeks and some days, and it was three weeks more before they began to frisk about. The nest was of loose construction, but soft and warm within, similar to those on trees, having an entrance in the side. Perhaps the reader is not aware that, when a squirrel's nest is disturbed, the mother will carry off the young to another one for safety: if once the hand has been in the nest, it is quite enough; it is of little use to leave the young until they get more advanced in growth, for they are sure to be gone. I may mention a very simple plan to catch squirrels, when they happen to be on detached trees. Put a small wire noose on the end of a long pole like a fishing-rod; ascend the tree leaving a few gaping folks below, to prevent the descent of the squirrel; with a deal of manœuvring try and put the noose over his head, and pull him gently down. Whoever is to get hold of him ought to be well provided with good gloves, otherwise he may have to repent of acting Jack Catch upon Mr. Squirrel. Perhaps Mr. Waterton may consider that I "deserve a birch rod" for what I have said, as he thought the Wiltshire shepherds did who backed Mr. Coward in his belief of the carnivorous propensities of the squirrel; if so, I can only say what I have stated is correct.

Cossey Gardens, Jan. 3. 1843.

ART. VIII. *On Grouping Trees in Parks and Pleasure-Grounds.*

By R. ERRINGTON.

GROUPS of trees, of considerable size, it is well known, are often planted in park and other open scenery, yet seldom have I seen it performed in a satisfactory way. I have noticed attempts of this kind, in which the trees being all of a size, and planted in the most circumspect way, at measured distances, would have led one to suspect they had been planned and planted by the carpenter.

No one, in my opinion, can plant a group of trees of considerable size, for immediate effect, without in the first place having a variety of heights disposed in a somewhat irregular way. Thick planting also must be had recourse to in many instances, or how shall the pendulous inclination of stems or branches be produced that gives graceful outline to the vista?

The operator in this case must set aside the idea of planting for profit, for this is in some degree incompatible with the effect which is sought to be produced. I once saw a park in which grouping with large trees for immediate effect had been attempted to a very great extent, and it was in its results a most miserable failure; the park was of immense extent, and presented in many places rather agreeable folds of ground, which, although not possessing expression enough for the picturesque, would, by judicious planting, have produced considerable diversity. Groups here and there were attempted of some twenty or thirty trees scattered at about equal distances and of equal heights; their distance asunder was so considerable, that they could not be said to act in unison in producing effect. Added to this they had been planted without the necessary preparation of making the holes, &c.; for, the soil being a stiff retentive clay, and withal what is termed technically "thin-skinned," it could not be expected that trees of from 20 ft. to 30 ft. high could flourish without some previous preparation, and a little of what gardeners term "pruning."

As regards planting groups for immediate effect, two things ae indispensably necessary, premising of course a judicious choice of situation. In the first place, capacious holes, adapted to the size of the tree, in making of which the upper or useful soil (if good), and the subsoil, should be thrown out in distinct heaps; and last, though not least, sufficient choice of trees, both as regards height and form, reserving the most pendulous or inclining forms for the exterior of the groups.

If the subsoil be a retentive clay, the trees can of course make no root to be depended on below the general clayey surface, therefore what they cannot do below must be done above. In this case, the tree should be planted on a mound, and the true collar of the tree should be nearly a foot above the common surface. A small cart-load of prepared soil should be ready for each tree, composed of one half free loam, and one half vegetable matter, well blended; this should be trimmed in amongst the fibres, and finally topped up with the original surface soil.

One of the most general faults that I am aware of, in the pleasure-grounds or shrubberies of the wealthy, is, the definite line formed by the sudden transition from the pleasure-ground to the park. How frequently do we see a wire fence in this position; studded on the one side like a nursery, with a dense mass of chiefly evergreens, and either suddenly naked on the other side, or with a few large deciduous timber trees, which (in winter at least) form no bond of connexion! Sir Uvedale Price and others have said much about masses of holly and thorn as connecting links, and to break the browsing line; but how few attend to it, although few dispute the principle!

After all, the best groups are and can be made out of enclosed plantations, provided the "painter's eye" has been at work. Here, by studying the varying forms, and seizing on what Price or some author calls "accidents," graceful groups may be formed, full of intricacy, possessing a good sky outline, together with a gracefully fringed vista; and, if the position of the plantation has been well selected, groups complete in themselves as to form, and conducive to the general effect, may be produced.

Oulton Park, near Tarporley, Dec. 1842.

ART. IX. *The Holly.* By CHARLES WATERTON, Esq.

> "See, Winter comes to rule the varied year,
> Sullen and sad, with all his rising train,
> Vapours, and clouds, and storms." THOMSON.

I AM very partial to the holly, the yew, and the ivy. They give both food and shelter to the birds; whilst their charming green foliage makes us almost forget that winter has set in. The holly claims my preference; for, in addition to food and shelter, it affords an impenetrable retreat to those birds which take up their quarters on its branches for the night.

Our ancestors knew and felt the value of the holly hedge, when the wintry blast whistled through the naked hawthorn. Hence they raised it as a barrier against the north; and, on the breaking of the clouds at noon, they would resort to the protection which it offered, and there enjoy the sun's delightful presence. But modern innovation, which, in nine times out of ten, does more harm than good, seems to have condemned the holly hedge as a thing of stiff unsightly form, and in its vacant place has introduced a scanty sprinkling of isolated plants. I own that I am for the warm arboreous plan of ancient days; and thus I never pass a garden where yew and holly hedges grow without stopping to admire them, and then I proceed onwards with favourable notions of the owner's taste.

But, to the holly in particular. I am so convinced of its utility both to men and birds, that I have spared no pains in rearing it as a shelter from the cold, when Boreas, sure harbinger of storms, sweeps over the dreary waste.

The deeper and richer the soil, so much the better for the holly. Still, this favourite plant of mine will thrive almost in any soil, and even amongst the clefts of rocks, where there is scarcely any soil at all. Neither can any of the four rude winds of heaven affect the perpendicular growth of the holly tree, although they make an impression upon the sturdy oak itself. Thus, in this neighbourhood, whilst we see the elm and the beech leaning towards the east by the overbearing pressure of the western blast, we find that the holly has not given way to its impetuosity. Indeed, keep the roots of the holly clear of stagnant water, and you have little more to do, for it forms its own defence; and, moreover, it has one advantage over most other plants, namely, it can push its way successfully up amid surrounding shade and pressure. Its lateral branches, too, will take root, so soon as they come in contact with the soft soil beneath them.

If you place a young holly plant in a full-grown hawthorn hedge, it will vegetate in that incommodious site; and will manage, at last, to raise its head aloft, and flourish clear of all opposition. Thus, driven from his native home, perhaps through scarcity of wheat and whiskey, I have known a hardy son of Caledonia, although put in a situation apparently hostile to advancement either in fame or in fortune, maintain himself under fearful trials of adversity. In process of time, his perseverance and honesty were crowned with complete success. He took kindly to it, where you thought there would be no chance of ever getting on; but, by carefully watching his hour of advance, in the death of this competitor or in the negligence of that, this frugal, careful, steady emigrator from the North moved slowly onwards, till, in due good time, he passed through all surrounding difficulties; and, having got at last into the full sunshine of good fortune, he there took the lead on the high road to long expected wealth and honours.

He whose nerves would be affected at the sight of a straight holly hedge, might prevent their irritation by forming a crescent; say a segment of a circle to a radius of sixty yards. This would present a fine appearance to the eye, whilst it shut out both the north-west and the north-east winds of winter. Hollies, too, may be planted in a clump, with very pleasing effect to the beholder. I consider a regularly formed clump of hollies to be the perfection of beauty, in grouped arboreal design. One single tree of mountain ash in the centre of this would add another charm to it, and would be of use to the ornithologist at the close of summer. When the holly trees are in full bearing, and the berries ripe, we may roam a long while through the whole extent of British botany, before we find a sight more charming to the eye than the intermixture of bright red and green which this lovely plant produces.

I have a fine circular clump of hollies here, under which the pheasants are fed; and to which, throughout the whole of the winter, a vast number of sparrows, green linnets, buntings, blackbirds, and some starlings resort, to take their nocturnal repose in peace and quiet. The holly sheds a large proportion of its leaves after the summer has set in. These remain on the ground in thick profusion. So formidable are their hard and pointed spikes to the feet of prowling quadrupeds, that neither the cat, nor the weasel, nor the foumart, nor the fox, nor even the ever-hungry Hanoverian rat, dare invade the well-defended territory. Hence the birds, which in yew trees and in ivy would be exposed to inevitable destruction from the attacks of these merciless foes, are safe from danger in the holly bush.

People generally imagine that the holly is of tardy growth. It may be so in ordinary cases; but means may be adopted to make this plant increase with such effect as to repay us amply for all our extra labour and expense. Thus, let us dig the ground to a full yard in depth, and plant the hollies during the last week of May, taking care to puddle their roots well into the pulverised soil. We shall find, by the end of September, that many of the plants will have shot nearly a foot in length, and that not one of them has failed, let the summer have been ever so dry. Small plants, bought in a nursery, and placed in your own garden for a couple of years, will be admirably adapted for the process of transplanting. Had I been aware in early life of this encouraging growth of the holly, it should have formed all my fences in lieu of hawthorn, which, after arriving at full maturity, suddenly turns brown in summer, and dies in a few weeks, without having given any other previous notice of near approaching decay.

Birds in general are not fond of holly berries; but many sorts will feed upon them when driven by "necessity's supreme command." Thus, during the time that the fields are clad in snow, and the heps and the haws have already been consumed, then it is that the redwing, the blackbird, the fieldfare, and the stormcock, numbed by the cold, and bold through want of food, come to the berry-bearing holly close to your house, and there too often fall a prey to the gun of the designing fowler.

In these days of phantom schemes and national extravagance, when work is scarce and penury fast increasing, the holly tree is doomed to suffer from the lawless pilferer's hand. When least expected, you find it arrested in its growth. Its smaller branches by degrees lose their vitality, and, by the end of the following year, one half of the tree appears as though it had received a blast from the passing thunder-storm. This declining aspect of the holly has been occasioned by the hand of sordid mischief. It is well known that birdlime is produced from its bark. In the spring of the year, at earliest dawn of day, our finest holly trees in this neighbourhood are stripped of large pieces of their bark by strolling vagabonds, who sell it to the nearest druggist. So common has this act of depredation been in this vicinity, that I should be at a loss to find a single holly tree, in any hedge outside of the park wall, that has escaped the knife of these unthinking spoilers.

Some six or seven years ago, there stood in the ornamented grounds of my baronet neighbour a variegated holly of magnificent growth, and it bore abundant crops of berries; a circumstance not very frequent in hollies of this kind. Many a half hour have I stood to admire this fine production of nature; for it was unparalleled, in this part of Yorkshire, in beauty, size, and vigour. But, at last, it was doomed to perish by a plundering and an unknown hand: one morning in spring I found the whole of its bark stripped off the bole, for full 2 ft. in length. Notwithstanding this disaster, the berries became ripe in due time; whilst its leaves apparently retained their wonted verdure upon the greater branches. Even the year following it was alive, and put forth new leaves and blossoms; but the leaves were of a stinted growth, and the berries did not attain their usual size. During the course of the third year from the day of its misfortune, the whole of the foliage fell to the ground; and then the tree itself became, like our giant debt, a dead unsightly weight upon the land.

Walton Hall, Jan. 19. 1843.

Memorandum. — The stormcock sang sweetly here every day throughout the whole of December, 1842, a circumstance never known before in my time. — *C. W.*

Feb. 13. — The late hurricane has made sad havock amongst my trees. The ring-doves cooed, this year, a full fortnight before their time. Still, the fine weather has not induced the chaffinch to sing a day sooner than his wonted period. The blackbirds had begun to arrange things for their nuptials, but old Boreas appeared last week and peremptorily forbade the banns.—*C. W.*

Art. X. *On the white Oak of the United States* (*Quércus álba* L.). By G. C.

In answer to your enquiries respecting the white oak, I have to state that it grows in all the middle States in America; it grows some distance south of Pennsylvania, but I do not know how far. I know it does not grow in the extreme southern States. It grows north of Boston, but it ceases to grow in Maine; therefore the oak that comes from New Brunswick, Nova Scotia, &c., is but of little value. White oak is good for building purposes; and the timbers of the old houses, barns, mills, &c., built with it, which is the case with most of them, are as sound, after standing 150 years, as those in this country that are built of English oak. White oak is the principal timber used in ship-building: all the line-packets are built with it, timbers, planks, and knees; and all the government ships of war are pretty much built of live oak, but planked with white oak. White oak is excellent for machinery, far surpassing any wood that we have in this country, being so much stronger and so much tougher than our ash. All the naves and sides of their light waggons and other vehicles are made with it, also the hoops or bows that go over the tops, whether covered with leather or canvass; also the spokes of the wheels, and being so much tougher than our oak they are made much less; the rims, or felloes, also, are sawed out of white oak plank, and being so much stronger than our ash or elm they are not near the size we have them, and will last as long again, as the wood is so much more durable. Shafts of all waggons, carts, &c., are made of it, let them be ever so heavy or ever so light. For coach-poles it is better than lance-wood, because it is lighter, and will not fly; it is better than our ash, because you can make it less, and it will not snap off like ash. All the frames of their railroad cars and steam-engines are made of white oak, and they make them lighter than we do with English oak, because it is tougher; also staves for casks, vats, &c. The white oak is the wood generally used there, more than oak and ash both put together are here, as it has the qualities of both, and is much superior. This wood enables the Americans so much to surpass us in carriage and steam-boat building. We are a quarter of a century behind them, at least. A gentleman's carriage here will weigh more than two of theirs; and there is as much difference between a steam-boat at New York and one at London, as there is between a gentleman's carriage and a common cart. When the white oak is small, it is fit for hoops for barrels, &c.; when it is as big as your arm, it is fit for all purposes that our ash is; and, as it gets larger, it is fit for all purposes that I have enumerated, and many others. I should say a nice warm sandy loam will suit the growth in this country. I do not think it would do in the deep clays, like our oak. I think a soil adapted for elms would suit it better.

Southampton, Dec. 2. 1842.

The American White Oak (*Quércus álba* L., Encyc. of Trees and Shrubs, p. 862.).—“A laudable anxiety to introduce this species on a large scale has existed in England from the days of Elizabeth to the present time; and, during this period, hundreds, nay thousands, of pounds have been expended in the importation of acorns. Bartram, Michaux, Cobbett, and a host of nurserymen, besides private gentlemen, have all signally failed. Cobbett, alone, expended many hundred pounds in his efforts to accomplish this object; and every plant he raised, I have no doubt, cost him a crown. Nurserymen do sometimes succeed in obtaining a few plants from a large importation of acorns; but at so great an expense, that no gentleman can afford to plant them: and this I call failing, failing to introduce this invaluable tree, for the purpose of forming plantations on that scale necessary to render it worthy of consideration in a national point of view. Acorns cannot be gathered from the tree on account of the expense, though even this might be submitted to, if the acorns would retain their vitality during their transit to England. The acorns generally germinate in a slight degree before dropping from the tree; consequently, if they are dried, they are, in effect, malted; if packed in a moist state they heat, or they germinate and the radicle perishes for want of soil and moisture. Young plants cannot be got from under the trees, because the acorns, as they drop, are eaten by wild turkeys, squirrels, pigeons, and other animals, or by swine. Some of the American oaks have thick and hard shells, and do not naturally germinate until the spring. With these sorts there is no difficulty, after they are once collected. They can be packed in moss, dry sand, or simply thrown into a barrel by themselves." The writer goes on to state that he is packing plants of the white oak to be sent to England, in perforated flour barrels, the plants being mixed with fresh moss; and that he has no doubt that they will arrive safe. The letter from which the above is an extract is dated New York, Nov. 21. 1841. Thirty thousand plants arrived safe in 1841, packed in the manner described, and they are now (1843) in a thriving state, in a favourable soil and situation in Surrey.

Acorns of the white oak, or of any other, may be brought over with perfect safety, if bedded in moist live moss, and planted as soon as they arrive, without pinching off the extremity of such of the radicles as may have pushed above an inch in length. (See *Arb. Brit.*, vol. iii. p. 1867.)

Plants of the white oak may be obtained by the thousand from several nurserymen in the South of England, who have procured them from the gentleman who introduced the 30,000 plants above mentioned. — *Cond.*

" In the *Descriptive Catalogue of the Derby Arboretum*," M. Vilmorin observes, " you have stated that the leaves of Quércus álba, when they die off, neither take the colour of yellow nor red, like the other American oaks. In my plantations at Barres, in which there are above fifty plants of this species, more than a half of them in the autumn take the colour of a beautiful purple violet." [This we have stated in the *Arb. Brit.*, vol. iii. p. 1865., and the *Encyc. of Trees and Shrubs*, p. 863.] " Neither do I admit the truth of what Cobbett says, that the leaf of the white oak is among the least curious and beautiful of the American oaks; on the contrary, I consider it one of the most beautiful, and, I should say, one of the most remarkable (le plus distingué) among those of the oaks of America. Its general form, the graceful outline of its lobes, profoundly sinuated and rounded; their consistence at once thin and firm; their upper surface smooth and of a clear green, which contrasts agreeably with the beautiful glaucous hue of the under side; their petioles sometimes of a bright red; in short, all these features have always appeared to me to give this leaf a charm, and a positive beauty, distinct from those of every other. I speak, it is true, of the leaves such as they show themselves on young and vigorous plants; perhaps on large trees they lose a good deal of their beauty. I acknowledge, also, that in matters which are judged of merely by the eye, every one judges according to the impression which he has received; and what I wish to say is, that my impressions are in favour of the leaves of Quércus álba. It is this partiality which has induced me to break a lance in its favour, as the chevaliers of other times did for the lady afflicted and molested, whom they took under their protection." — *Vilmorin. Paris, Feb.* 6. 1843.

The acorns of the white oak, in America, are preferred before all others for fattening swine; and the swine are so fond of them, that they will not eat any other acorns as long as those of the white oak last. A good white acorn year is always a good year for pork. — *J. D. Feb.* 15. 1843. [A young gardener who spent six months travelling in America, and who is now very anxious to go to China as a natural history collector.]

Art. XI. *Dimensions of large Trees and Shrubs, collected with a view to a Supplement to the* Arboretum Britannicum.

It is our intention, in the course of the present year, to publish a *Supplement to the Arboretum Britannicum,* chiefly for the sake of introducing descriptions and figures of the new species of pines and firs introduced from Mexico by the Horticultural Society, and of certain trees and shrubs recently raised from Himalayan seeds (all given in our abridged *Arboretum*); but partly, also, to record the dimensions of remarkable specimens of trees and shrubs now growing in Britain, which have been sent us since the *Arboretum* was composed, or which may be sent in the course of the next three months.

We shall therefore be greatly obliged to our readers and correspondents, if they will cooperate with us in this matter, and send us dimensions of large specimens with as little delay as possible.

Large Trees at Stratfieldsaye, -the Seat of His Grace the Duke of Wellington.

A Norway Spruce (*A*'bies excélsa), 110 ft. high. This is the highest tree in the grounds; its girt at 4 ft. from the ground is 10 ft., and at 20 ft. high 8 ft., gradually tapering upwards.

A Cedar of Lebanon (*C*èdrus Libàni), 100 ft. Apparently in its prime.

A Silver Fir (*P*ícea pectinàta), 102 ft., branching to the ground.

A Weymouth Pine (*P*ìnus *S*tròbus), 92 ft.

A Pinaster (*P*ìnus *P*ináster), 86 ft.

A Hemlock Spruce (*A*'bies canadénsis), 46 ft. A very handsome plant.

A Tupelo tree (Nýs*sa* biflòra), 31 ft. Growing vigorously.

A Liquidambar (Liquidámbar Styracíflua), 69 ft.

A Tulip tree (Liriodéndron Tulipífera), 87 ft.

A Scarlet Oak (*Q*uércus coccínea), 96 ft. Girt at 7 ft. high 9 ft., with a very fine head.

A common White Oak (*Q*uércus pedunculàta), 80 ft. Girt at 4 ft. high 15 ft. 9 in., and at 15 ft. high 14 ft.

A Lombardy Poplar (*P*ópulus fastigiàta), 101 ft.

The Elms (*U*'lmus campéstris var.) in the avenue average from 70 ft. to 80 ft. high, and girt at 6 ft. from the ground from 12 ft. to 15 ft.

The above are the highest trees at Strathfieldsaye, but there are a great many of each variety nearly as high.—John Johnson.

Stratfieldsaye Gardens, Feb. 11. 1843.

Art. XII. *Notice of Two new American Roses lately introduced.*

By J. W. B.

R*O'SA rubifòlia élegans*, the Prairie Rose.— A fine climbing rose of very robust habit, often making shoots of from 10 ft. to 12 ft. in the season. Flowers semi-double, in clusters of from eighteen to twenty-five in each, and of a deep pink colour. Found by R. Buist of Philadelphia, in the state of Ohio. *R. Buist.*

Rò*sa rubifòlia var.* Prairie Queen.— A seedling of *R*òsa *r*ubifòlia élegans, which was raised by Mr. S. Feast of Baltimore. Of a stronger habit than *R. r.* élegans; flowers quite *double*, and imbricated, in clusters. Similar, *but superior*, to the strong-growing varieties of Noisettes. Colour bright pink. *R. Buist.*

Mr. J. W. Brown, who brought over a plant of each of the above roses from Mr. Buist, saw both in flower in Mr. Buist's nursery in the summer of 1842, and bears testimony to the truth of the above descriptions by Mr. Buist.—*London, Dec.* 1842.

ART. XIII. *On the Culture of the Chinese Primrose.* By JOHN GULLETT.

HAVING for several years succeeded in growing my Prímula sinénsis in great perfection, I submit the following system of cultivation. I endeavour to get my seeds ripe, but sometimes I sow them when just turned brown, in the last week in July, or first week in August, placing them on a little heat, to get them up as soon as possible. When the second leaf gets the size of a sixpence, I pot them off in thumb-pots in the following compost: one third well decomposed leaf mould, one third sandy peat, and one third two-years-old cow-dung. In five or six weeks, I shift them into 60-sized pots; and when they have filled those pots with their roots, which will be in about two months, I shift them again into 48-sized pots, and in these I blow them, keeping them in a cold frame till February, when I take them into the greenhouse, and have them in bloom in March, at the time all the treatises on the Chinese primrose which I have seen recommend to sow the seed.

You see I gain a season; and my flowers are much larger and finer than those I see any where else.

Woodbine Cottage Gardens, Oct. 23. 1842.

REVIEWS.

ART. I. *New Zealand and the New Zealanders.* By Ernest Dieffenbach, M.D., Naturalist to the New Zealand Company, Honorary Member of the Aborigines Protection Society. Pamph. 8vo, pp. 30. London, 1841.

Travels in New Zealand; with Contributions to the Geography, Geology, Botany, and Natural History of that Country. By Ernest Dieffenbach, M.D., late Naturalist to the New Zealand Company. In two volumes 8vo, pp. 827. London, 1843.

THE first of these works is a pamphlet chiefly occupied with an account of the native population. The second is a very interesting relation of what the author saw during several journeys into various parts of New Zealand, in the years 1839, 1840, and 1841; including a grammar, dictionary, and specimens of the New Zealand language.

In pointing out the superiority of New Zealand to other British colonies, Dr. Dieffenbach observes "that the climate is not only similar to that of England, but even milder than that of our most southern counties, whilst, at the same time, it is healthy and invigorating! The children of Europeans, born in this country, show no deterioration from the beauty of the original stock, as they do in New South Wales and Van Diemen's Land. A great part of the country possesses a soil which yields all those articles of food which are necessary for the support of Europeans, especially grain, potatoes, fruit, and every variety of garden vegetables; it possesses materials for ship-building and domestic architecture in its timber, marble, and freestone; the coal which has been found will probably prove sufficient in quantity for steam-engines and manufactories; its coasts are studded with harbours and inlets of the sea; it is intersected by rivers and rivulets; its position between two large continents is extremely favourable; in short, it unites in itself everything requisite for the support of a large population in addition to the native inhabitants. No other country possesses such facilities for the establishment of a middle class, and especially of a prosperous small peasantry, insuring greatness to the colony in times to come.

"It is, I conceive, no small praise to a country that in it labour and industry can procure independence, and even affluence; that in it no droughts destroy the fruits of the colonist's toil; no epidemic or pestilence endangers his family;

that, with a little exertion he may render himself independent of foreign supply for his food; and that, when he looks around him, he can almost fancy himself in England, instead of at the antipodes, were it not that in his adopted country an eternal verdure covers the groves and forests, and gives the land an aspect of unequalled freshness and fertility." (Vol. i. p. 4.)

The climate is wet and windy. "New Zealand, being situated within the temperate zone, although nearer the equator than Great Britain, possesses, from its peculiar geographical position, especially from its being insular, and also from the nature of its surface, a climate so modified as to resemble that of England more nearly than that of any other country I am acquainted with. It is moderate in every respect, the range of its temperature throughout the year and during the day being very inconsiderable. This is principally owing to the immense expanse of ocean which surrounds these narrow islands on all sides, preserving a temperature little varying, and moderating alike the cold of the antarctic regions, and the heat of the tropics." (Vol. i. p. 173.) "Without pronouncing a decided opinion from a single series of observations, and these taken at only one place, and during ten months, I may, I think, safely draw the conclusion that New Zealand has a rainy climate, and may be ranked, in this respect, with several places in England." (Vol. ii. p. 176.)

Notwithstanding this flattering picture, many of the emigrants who have flocked to New Zealand during the last two years have been sadly disappointed; because they did not intend to make their new colony their second home, but to export native produce, and, after having made a rapid fortune, to return to their native country. Our author, however, shows at length, "that there is at present in New Zealand no article of export which can be depended upon, to procure that balance of trade which is necessary for the success of all commercial communities. Exports must be created in the island by means of the agriculturist; and it is the highest praise of the country that they can be created, and that they do not differ from the same articles produced at home. England, in former times, had scarcely more exports than New Zealand has now; but the internal resources and geographical position which secured to Great Britain its unequalled prosperity are, although much inferior, yet similar in New Zealand, and may give her, in the course of time, as high a position.

"It will readily be concluded from these observations that, in the first settlements of New Zealand, by far too much importance has been attached to commerce and to those natural products just mentioned, and that many incorrect and exaggerated statements on the present capabilities of the colony have been brought forward. In a country like New Zealand, favoured in so many respects by nature, but which cannot be regarded as an entrepôt or point of transit, the first question as to its future prosperity and success should be: — Can the settlement produce all that it may require for internal consumption, and will provisions be cheap as compared with the price of labour? This should, undoubtedly, be the case in New Zealand; and, consequently, the supply of provisions to ships and to the Australian colonies, will be the principal source of export from the colony.

"To afford facilities to the first settlers of creating agricultural produce; to extend the utmost liberality to those who have purchased land and intend to become working colonists; to permit them to have an extensive choice, that they may select the good land in preference to the bad; to give them legal titles accordingly, and not to allow them to consume their capital after their arrival in the colony by a delay of the surveys, are the only means of securing prosperity to New Zealand. Under such circumstances, the system of land sales in England at a fixed price, and the application of the purchase-money to send out agricultural labourers and mechanics in a just ratio to the demand of labour, the price of provisions, the quantity of capital employed, and the actual produce of the land, accompanied by a sound discretion as to the number of emigrants sent out, cannot, it appears to me, be easily replaced by a better one." (Vol. i. p. 9.)

"The value of New Zealand as a British colony cannot be estimated too highly. For a certain class of colonists it is preferable to New South Wales, which will never be any thing else than a large pasture ground. It is situated near numerous groups of interesting and important islands, the Navigator's, the Friendly, and Society Islands, which are rapidly advancing in civilisation and peaceful commerce; and some of which already afford sugar, coffee, and other colonial produce, and require in return articles of European manufacture. It is a country suited particularly to Europeans, from the nature of its climate and soil, and seems to be destined to become a prosperous agricultural and manufacturing state; but only a laborious peasantry can clear the road for this, and render the colony, in time, an entrepôt of commerce or a depôt for transit trade and a manufacturing country, none of which it is at present." (Vol. i. p. 18.)

The chief drawbacks to New Zealand, as a colony, arise from the high price charged for the lands; the greater part of which, Dr. Dieffenbach says, "is already disposed of to private individuals and to the New Zealand Company." (Vol. i. p. 18.)

Thus far with reference to gardeners who may intend to emigrate. We shall next glance at the chapter on the "Botany of New Zealand." "The area of the three islands is 51,584,000 acres [the British Islands contain 57,952,489], and the total number of plants at present known, including the marine plants, does not amount to more than 632 species [those of the British Isles exceed 9000 species.] This small number is not perhaps due to our little acquaintance with New Zealand, and to the want of a sufficient botanical exploration of the country; for, although there is no doubt that some more species will be added, when we shall have examined the rugged and snowy mountain crests of the middle island, yet it appears to me that their number will not materially alter the asserted fact, that, for the extent of its surface, and for the varied localities which it offers to the growth of plants,—as mountains reaching above the limits of lasting snow, stony and exposed ridges, burning and extinct volcanoes, valleys and ravines with a fertile soil (where moisture and moderate warmth, so favourable to vegetable life, continually prevail), volcanic table-land, swamps and morasses, downs on the sea-coast, &c.,—the flora of New Zealand is distinguished by a scantiness of species. In this latter respect the vegetable corresponds with the animal kingdom, which, however, is still more deficient. Several zealous botanists have bestowed their labour on plants of this country" (Vol. i. p. 419.)

"Although in its flora, New Zealand has some relationship with the two large continents between which it is situated, America and Australia, and even possesses a number of species identical with those of Europe, without the latter being referable to an introduction by Europeans, yet the greater number of species, and even genera, are peculiar to the country, which astonishing fact had already forced itself upon the minds of the first explorers. New Zealand, with some of the adjacent islands (the Chatham, Auckland, and Macquarie's), forms a botanical centre. It is sufficiently distant from both continents to preserve its botanical peculiarities, and it offers in that respect the most striking instance of an acknowledged fact in all branches of natural history, viz., that the different regions of the globe are endowed with peculiar forms of animal and vegetable life.

"The number of species at present known is 632, of which number 314 are dicotyledonous or endogenous plants, and the rest, or 318, monocotyledonous and cellular plants. To what can this remarkable disproportion be due; so contrary to what is the case in other countries? Is it owing to the geological fact that New Zealand is of recent formation, and that in such countries the plants which are regarded as inferior, the cellular and cryptogamous plants, make their appearance before the more developed flowering ones. Without discussing this difficult question, I merely observe that the visitor to the distant shores of New Zealand will be struck by the scantiness of annual and flowering plants, of which only a very few possess vivid colours, and would attract the attention of the florist. In their place he will find a number of trees and ferns of various descriptions, of which the greater part of the flora consists. But these give at once a distinct character to the vegetation. If the traveller should happen to come from New South Wales, he cannot but observe, either that the glaucous colour of a New South Wales landscape, produced by the Eucalypti, Casuarineæ, Acaciæ, and Banksias of its open forests, which is only relieved in certain alluvial situations by a fresher green, and in certain seasons and localities by a variety of beautiful flowers, has given way in New Zealand to the glossy green of a dense and mixed forest; or that the landscape, when it is covered with the social fern, has assumed a brown hue. In the former general aspect, together with the tree-ferns, palms, and dracænas, which abound in New Zealand, that country resembles one situated between the tropics, and especially the beautiful islands of the Pacific." (Vol. i. p. 421.)

There are 245 species of flowerless plants, including 48 algæ, 28 lichens, some fungi, several mosses, and a great many ferns. "Of all plants, however, the ferns and fern-like plants are the most numerous in New Zealand, as they are not only the most common plants as regards the number of the genera and species, but especially as regards the number of individuals of one and the same species: covering immense districts, they replace the Gramineæ of other countries, and give a character to all the open land of hills and plains. Some of them grow to 30 ft. and more in height; and the variety and elegance of their forms, from the most minute species to the giants of their kind, are astonishing. Although 94 species of ferns are already known, every day adds new treasures to our knowledge. There exist three tree-ferns, the Cyathea medullaris, C. dealbata, and Dicksonia squarrosa. The Marattia elegans also assumes a tree-like appearance. The Cyathea dealbata is the highest; I measured some 40 ft. in length. These trees generally grow in groups." (Vol. i. p. 423.)

The number of exogenous plants is only 76. There are 24 grasses, and 20 *Cyperàceæ*; one palm, the *Arèca* sápida, which grows to the height of 40 ft. with a stem a foot in diameter. The undeveloped leaves are eaten by the natives, and when full grown they are used for roofing their houses. The genera Dracæ̀na, Cordylìne, and *P*hórmium are common, with other *A*sphodèleæ, on the alluvial banks of rivers. There is a variety of New Zealand flax (*P.* tènax), with yellow-striped leaves, which is scarce. Ripógonum parviflòrum *R. Br.*, one of the *S*milàceæ, is a common and luxuriant climber in forests, and its stem forms the supplejack of Europeans. There are three species of *I*rídeæ, and about treble that number of Orchidàceæ. The *Calàdium* esculéntum is cultivated, but according to the natives not indigenous, their ancestors having brought it with them at their first immigration. The swamps are covered with *T*ỳpha angustifòlia, the roots of which are eaten, and the stems and leaves tied in bundles and used both for walls and roofs to their houses. Freycinèt*ia* Bánks*ii* is a monocotyledonous climbing plant, the sweet bracteæ of the blossoms of which are eaten by the natives. Of Coníferæ and *T*axíneæ, there are eight species, which produce the most valuable timber of the island. *Dámmara* austràlis, the only cone-bearing tree, is confined to the extreme north of the Northern Island. The other species are Phyllócladus *t*richomanöides, P. sp., Podocárpus ferrugínea, P. *totàra*, P. sp., Dacrýdium *màï*, D. plumòsum, D. excélsum, D. *c*upréssinum, and D. sp.

Of *E*rìceæ, there are three species of Gaulthèr*ia*; and there are examples, in all, of between 60 and 70 orders of Dicotyledòneæ.

The general conclusion to be drawn from Dr. Dieffenbach's book is, that very little is to be expected from New Zealand in the way of botanical riches; but that it is an excellent place for an able-bodied agriculturist willing to work, and with a small capital, to emigrate to; more particularly if he can purchase an allotment of good land, favourably situated, at a moderate price.

Every page of this work is full of interest, from the novelty of the occurrences and the scenery, and it is illustrated by some beautifully executed engravings of remarkable portions of scenery and animals. The author is evidently a man of most extensive views, liberal, enlightened, benevolent, and, like almost all learned Germans, remarkably free from prejudice of every kind, a man after our own heart.

A manual of the botany of New Zealand, Dr. Dieffenbach informs us, is expected from the pen of Sir W. J. Hooker.

Art. II. *The Natural Principles and Analogy of the Harmony of Form.* By D. R. Hay, Decorative Painter to the Queen, Edinburgh; Honorary Fellow of the Royal Institute of the Architects of Ireland, and Author of "The Laws of Harmonious Colouring," &c. 4to, pp. 50, with 19 plates, and numerous woodcuts. Edinburgh and London, 1842.

Mr. Hay is the author of a work on *Colouring*, which is in much esteem, and has gone through several editions. In the work before us it is attempted to show "that the impressions made upon the eye by forms are really founded on natural principles, and that the proportions and peculiarities of form which produce the most pleasing impressions are in reality, as well as appearance, dictated by nature, being a response to these principles in the human mind. If it can be shown," Mr. Hay continues, "that, agreeably to the boundless analogy by which the sciences and arts are connected, forms are in all respects analogous to sounds, and that consequently a system of linear harmony can be established, similar to that which regulates the arrangement of musical notes, a knowledge of this important branch of art may become a part of elementary education." (p. 4.)

The author, after this introductory idea, endeavours to prove the analogy between the natural principles of harmony and form, and their analogy to those of sound and colour.

"That form, in its effects upon the eye, is analogous to sound in its effects upon the ear, has been generally admitted." There are three kinds of harmony in sound; that produced by the intonations of the voice of the orator, that by the tones of the vocalist, and that by vocal and instrumental music combined. Forms also address themselves to the eye in three ways; to the judgment as in architecture, to the feelings as in sculpture, and to the imagination as in historical painting. Colour has its three effects of harmony: in the three neutrals, white, grey, and black; in the natural colours of landscape; and in the brilliant hues of flowers, and the plumage of birds.

"Forms are therefore analogous to sounds and colours in their effects upon the senses, and through the senses upon the mind. But the proving of this analogy would do little in the formation of an intelligible system of harmony of form: it must be shown that a perfect analogy also exists in the component parts producing these effects." (p. 10.)

The author next proceeds to prove that, as there are three primitive colours, red, blue, and yellow; three primitive sounds, the tonic, the mediant, and the dominant; so there are three primitive forms, the circle, the triangle, and the square. He next shows that these forms arise naturally out of one another, and that they may be combined like the tones in music.

To follow the author farther with advantage, a scientific knowledge of music is absolutely necessary; and, as we are deficient in this respect, we feel ourselves incompetent to pronounce judgment on this part of the work. We can only say that it appears well reasoned and consistent in itself; though we must confess that the author's application of it to some of the buildings of antiquity has failed to produce in our minds that conviction of its utility which might have been expected, notwithstanding our inability to follow up his musical analysis. As a specimen of the author's application of his principles we give the following:—

"The most perfectly harmonious production in architecture that exists, is, by the concurrent opinion of the best judges in all ages since its production, the Parthenon at Athens. Whether this structure owes its perfection to an acquaintance with a particular system of applying the natural principles of form to architecture, lost to succeeding ages, or to the natural genius of the designer alone, is a matter of doubt, and may ever remain so. But, whether the knowledge of the artist was acquired or intuitive, it must be admitted that the elements of harmony are transcendently displayed in this great work.

"The melody, or general outline, of the temple itself seems to enter into combination with the hill upon which it stands, and thus to make up the harmonic triad of the third class of forms. This is endeavoured to be shown in Plate XIV. In the centre of the diagram formed by the repetition of the line 1st to 5th, within the ellipsis, it will be observed that the component parts of the temple occur, as marked by the strong line. These being removed from the harmony of combination to that of succession, the curve of the ellipsis becomes its fundamental bass, and the temple itself supplies the other two component parts of a melody.

"The melody is only appreciable at such a distance as allows the general outline of the temple, in combination with the hill upon which it was placed, to be encompassed by the eye of the spectator: consequently, when he ascended the Acropolis, the curvilinear forms, which at a distance made up the harmonic triad, disappeared. Instead of which, however, the most beautiful harmony of combination was presented to his view, accompanied, as has been proved by late investigations, with an equally perfect harmony of colour. The curvilinear form, so amply supplied in the distance, which, like cool colours in nature, always predominate in the most pleasing combinations, he now finds in equal proportionate quantity, not only in the horizontal and perpendicular lines of the columns, but in the exquisite bas-reliefs which embellish the frieze and tympanum. The taste and knowledge of the artist is further disylayed; for, that there might be no harsh or sudden transition from the curved to the perfectly straight line, the architrave, frieze, and cornice approach the tympanum by an almost imperceptible curve.

"In thus gliding, by an imperceptible gradation, from one component part of harmony into another, a facility easily attainable in form, but which can only be attained in music by the human voice, is made available.

"The portico, or front elevation of this temple, from the base of the columns to the extreme point of the pediment, is inscribed by the parallelogram adopted in this treatise as the second of the general series of forms. It has been already observed, that geometricians have given no definite rules for the proportions of this particular form; but that in question has peculiarities which are worthy of remark in this place.

"It is the only rectilinear form that is not produced by the intersection of the mediant line drawn from the first to the fifth division of the circle, therefore requiring in its formation the second line, which is drawn from the first to the third division. Neither the equilateral triangle, the square, nor the rhombus, can be produced by any smaller number of forms of a similar kind and proportion to themselves than four; and it takes the same number of parts to reproduce a parallelogram of any other proportions; but this can be reproduced by three and also by four. If its length be divided into the semitonic division of twelve, its breadth will be seven of those divisions; consequently, when three are placed together perpendicularly, their length will be collectively twenty-one of those divisions.

"In this triple capacity it seems in the present case to be employed, and its shorter dimension is therefore divided, as shown in the scale, Plate XV. The subdivision of the parts of this unequal structure are, agreeably to this scale, as follows:—

"The perpendicular and obviously curvilinear portion ends, and the horizontal or rectilinear portion begins, on the seventh semitonic division of the parallelogram, the perfect fifth or dominant of the present scale of the musician. The horizontal or apparently rectilinear part ends, and the oblique or angular part commences, on the next musical consonance, the sixth or submediant of the same scale. (Plate XV.)

"Taking the dimensions from the elevation of the portico as given in Stuart's *Athens*, the minute groove cut below the capital of the column is one of these semitonic divisions. From centre to centre of the columns on each side of the middle space is three of those divisions; and this is continued, with a slight deviation, till the last division, which must include the outer column. The space which includes the columns is exactly the proportion of the second parallelogram produced within the ellipsis, as the first was within the circle. If this be divided into twelve parts, the capital will be found to be one of these in height, and the triglyphs one of the same in breadth. But these matters can only be properly investigated by the architect, whose education enables him to enter into details with which the unprofessional are necessarily unacquainted." (p. 40.)

The conclusion at which the author arrives is, "that form, like sound and colour, has its three primaries; and that consequently there can be no perfectly harmonious combination of forms in which one of these is wanting; and that the distinctions of harmony, like those of sound and colour, depend upon a predominance of one, and a subordination of the other two, in the composition." (p. 42.)

Granting the premises, it is impossible to deny that the conclusion is legitimate; but the difficulty is, to show the application of the doctrine in such a manner as shall be intelligible to architects who are not at the same time conversant with the theory of music. We cannot help thinking that, as the theory is undoubtedly founded in nature, this might have been done, at all events, to such an extent as to carry conviction to artists who have no musical knowledge.

In an appendix to the work are the following paragraphs, which every artist can understand and appreciate, and which would seem to justify our opinion, that the theory might have been brought down nearer to the capacities of those who, like ourselves, are ignorant of the science of music.

"It has been observed, that the series of forms in which the ellipsis takes the place of the circle exercises a softer influence on the eye; and that the combinations of those forms are more natural, and the harmonies they produce more pleasing, than those arising out of the combinations of the forms which have the circle for their key. This would, at first sight, appear quite paradoxical. But it must be taken into consideration, that we are made to view nature with two eyes, whose rays traverse or cross each other horizontally; and that, consequently, any object of a horizontally elongated kind can be more easily encompassed by the visual rays than any of the more primary or homogeneous forms. The eye, in this double capacity, associates its rays at once with the forms in which the three elements, earth, air, and water, are generally presented to our view, and in which, consequently, the landscape-painter generally transfers their effects to his canvass.

"Landscape composition has its linear harmony, as well as architecture, sculpture, or historical painting; and it likewise consists in the judicious arrangement of the three elementary parts of form, or the straight line, the angular line, and the curved line. In this, as in every case where various forms are combined, there can be no perfect composition, unless the harmonic triad be present. But the parts of this triad must not be jumbled promiscuously together, however irregular the general characte rof the subject may be; for, if linear harmony exists, there must be system in it, as there is in every other kind of harmony; and this system must consist in certain geometrical rules. Such a system is attempted to be developed in the foregoing treatise; and it is assumed that it has the leading features of a natural theory in the extreme simplicity of its elementary parts, and the endless variety of combination of which they are susceptible.

"The harmony of forms depends much on the propriety of their position, and a strict adherence to the key or tonic in a composition. The three primary forms, the circle, the triangle, and the square, have each only one proper position. The first, indeed, can take no position but one, while the secondary and tertiary forms have two proper positions, the horizontal and vertical. These positions must be strictly adhered to; for obliquity in this case is inadmissible, and, as already shown, can only be employed to produce angular forms. When the circle is the key or tonic adopted, the square and the equilateral triangle will be the leading features of the forms introduced into the composition. When the ellipsis is the tonic, their leading features will be the parallelogram and rhombus, whether the composition be horizontal or vertical. There can be no properly harmonious composition in which this classification is not attended to. No doubt men of great genius can do this instinctively, and to such, a knowledge of rules is superfluous: but rules are requisite to enable the generality of mankind to appreciate judiciously the works of men of genius." (p. 48.)

ART. III. *An introductory Lecture, delivered at King's College, London, January* 24. 1842, *on the Principles and Practice of Architecture. To which are now added a few Notes, and some further Remarks on the modern Practice of Competition.* By William Hosking, F.S.A., Architect and Civil Engineer. London, 1842. Pamph. 8vo, pp. 42.

THE pages of this pamphlet are occupied in enumerating the various kinds of buildings, and operations connected with them, which fall within the province of the architect to originate and direct, with the author's particular opinions on the modern practice of competition. We shall make one short extract, for the sake of the last sentence.

"The largest class of buildings yet remains; and it will be found that, great as the variety of requirement is in buildings distinguished as public, it is even greater in the class of dwelling-houses; for, although every house may be resolved into the three departments which the uses and habits of social life require (every house having its sitting-room, its sleeping-room, and its cooking-room), the nobleman's mansion must have these multiplied and extended, with accessories to include all that human wants and wishes can demand; whilst the shopkeeper is content to expose his goods for sale in the best parts of his house, and to cook, eat, and sleep where his business may leave him room; and the labourer, in his turn, is but too glad to find his cottage so arranged by the economic skill of the architect, that cooking, eating, and sleeping have each a separate apartment. The idea of a peasant's cottage being included in the studies of an architect may excite a smile; but, if architects were more employed upon peasants' cottages, there might be less occasion for their services in building county hospitals and union workhouses."

ART. IV. *Literary Notices.*

FREQUENT complaints have been made to us that we do not state the prices of the books which we review or recommend; and the reason is, that we cannot do so, except under particular circumstances, without incurring the advertisement duty. We propose, however, in future to adopt the mode followed in the *Literary Gazette, Athenæum*, and similar journals, to give a monthly list of books, which we think worth purchasing or reading by gardeners or their employers, with their prices, unless we find some consequences resulting from the publishing of such a list, which we do not anticipate. Our list for this month is:

Hay on Form, 4to, 16*s*. (rev. p. 126.).
Dieffenbach's New Zealand, 2 vols. 8vo, 24*s*. (rev. p. 130.).
Pugin's present State of Ecclesiastical Architecture in England, 8vo, 9*s*.
Thomas's Monuments and Chimney-pieces, 8vo, 16*s*.
Jones's Designs for Mosaic Pavements, 4to, 21*s*.
Fraser's Scientific Wanderings, 5*s*.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

A Pocket Plant-Case for Ladies. — Some young ladies of our acquaintance who are remarkably fond of gardening, and particularly of raising plants from seed, having been lately residing principally in London, where they have no garden, have contrived a very ingenious substitute for a hotbed, by having recourse to their side pockets as a source of heat for germinating seeds. The seed, enveloped in some moist moss, is put in a small tin case, commonly one which has been used for pepperment lozenges, or acidulated drops. The case, so filled, is carried about the person constantly during the day, and put with the pocket under the pillow during the night. When the seeds have germinated, and the plumule, as well as the radicle, has appeared, the seed, having now become a plant, is taken out and planted in a pot. The same ladies have germinated seeds by suspending them over water in a hyacinth glass, or small carafe; and in this manner they have raised trees from filberts, which, being afterwards planted in the open ground in the country, have, in the course of a few years, borne fruit. They have also raised oaks, sweet chestnuts, and various other plants. — *Cond.*

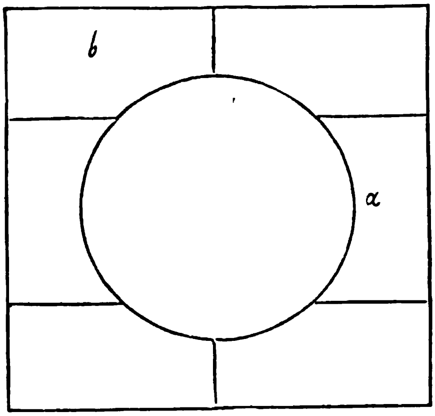

Fig. 13. *Welch's Bricks for circular Flues.*

Welch's Bricks for forming circular Flues, without any additional expense for materials or labour beyond what is necessary for the common square flues, well deserve the attention of the architect and builder. Two moulds are all that are necessary to effect the object, viz. moulds to make the bricks (*a* and *b*, *fig.* 13.), each 9 in. long. The idea is a peculiarly happy one and does Mr. Welch great credit. He has taken out a patent for it. Any direction may be given to the flues by beveling the bricks, which, of course, will require other two moulds. — *Cond.*

Turf Drains are used in different parts of the country, particularly in meadows and pastures. Mr. Saul recommends section *fig.* 14., and as a cover *fig.* 15., which is 10 in. long, 7 in. broad on the upper side, 5 in. broad on the under side, and 3½ in. thick. When made of peat and thoroughly dried in the sun, they are remarkably strong, and will last many years: some in this part of the country have stood for thirty years, both in land pastured and under the plough. A man will cut about 2,500 of these turves in a day, having a spade made on purpose, with a ledge on each side, so that the peats are all cut to the same size. He cuts from a breast of peat earth which is from 3 in. to 4 in. deep in front of him; he pitches them as he cuts them from the breast to his labourer, who is provided with a sort of carriage with one wheel on which he puts the covers. When he has got a sufficient load, he moves them to a short distance, and places them in rows to dry in the sun and wind. They stand a few weeks in this way, and are then turned over and remain for some time longer. They are then piled up in rows three deep, so that the sun and wind get better at them than if they were all on the ground. In this state they remain till they are completely dried; they are then made into large stacks till they are wanted for use. The stacks are so made that the rain passes off them the same as off the roof of a house. These peats are sold at 5*s.* per thousand. The prime cost may be considered about 3*s.* per thousand. The man has about 2*s.* 6*d.* per day, and labourer 2*s.* The time of cutting them is in April and June; it will not do to cut them till the frost is over.

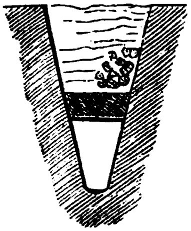

Fig. 14. *Section of a Turf Drain.*

Fig. 15. *View of a dried Peat Covering-Turf for a Drain.*

Fig. 14. shows the drain cut and furnished with the peat cover. The drain is cut from 20 in. to 30 in. deep, as circumstances may require. The workmen have spades made on purpose. The price of making these drains is 2½*d.* per rood, so called here, which is seven yards in length, the materials being laid at the place. At this price a man will make about 2*s.* per day. When the covers are placed on the drain, a little strong gravel or small stones are put in, as shown in the figure, to take the top water into the drain. The drain covers being on the principle of the wedge, weight increases rather than diminishes their strength, which is not the case with common draining tiles.—*M. Saul. Garstang, Dec.* 22. 1842.

Perhaps the following plan may be added to the one above described. Where peat earth is not to be got, I have seen the following mode practised to a great extent, and it has been fairly proved to stand for a great number of years. The plan is simply this. Line out the drains in pasture lands; and, in cutting out the top sod, do it on the wedge system. The drains are cut the same as in *fig.* 14. The plan is called sod-draining. These sod-drain covers are cut so that the grass side is downwards. They are about 6 in. thick, and of the same length and breadth as the peat covers shown in *fig.* 15., and they are laid in the drain in the way before mentioned. I have been induced to try whether these sod covers could be forced into the drain by pressure, and have jumped upon them for this purpose, but found that the more I jumped upon them, the stronger they were; so that, after the drains have been filled up according to the plan I sent you, there is no fear of their being injured by either cattle or carts passing over them.—*Idem. Dec.* 29, 1842.

By a subsequent letter from Mr. Saul, we learn that the Duke of Hamilton is supposed to have housed more than 100,000 of the turf-drain covers (*fig.* 15. above) on his estate in the neighbourhood of Lancaster, and that he would have housed more if they had been to be got; but the demand by other proprietors and by farmers has greatly exceeded the supply.

Flower-pots with hollow Sides (*figs.* 16. and 17.), by Mr. Brown of Ewell, and Mr. Saul of Garstang.

Mr. Brown's Pot with hollow Sides (*fig.* 16. copied from the *Gard. Chron.* for 1842, p. 803.) may have the vacuity filled with water through a small orifice in the rim shown in the figure, or left empty at pleasure. Every reader is aware that plants will be prevented from suffering from want of water when the vacuity is filled, and from having so much heat as usual carried off by evaporation from the sides of the pot when the vacuity is empty. Such pots are peculiarly suited for plants in rooms, and they might be rendered clean-looking or ornamental by being glazed externally. Care should be taken, however, not to glaze them of a green colour, nor to endeavour to render them ornamental by coloured imitations of flowers, or other natural objects, for reasons that we need not here insist on. The colour may be of stone or brick, and the ornaments, if any, should be sculptures, not paintings. (See Quatremère de Quincy *On Imitation.*)

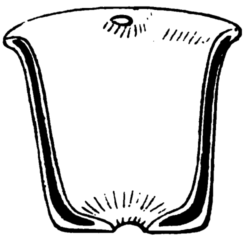
Fig. 16. *Mr. Brown's Flower-pot with double closed Sides.*

Saul's Fountain Flower-pot (*fig.* 17.) has hollow sides with a stopper, and it supplies the plant with water on the same principle that a glass fountain supplies a bird in a cage. An outer basin is made on the bottom of the pot, to which the water enters at *a*, and is carried round the pot in the basin, there being two or three holes through the bottom of the pot, as seen at *b b b*. By these means the water is drawn up from the basin by the roots of the plants; or, if it should be desirable to prevent it from being drawn up, the exterior orifices of the holes which open into the basin or saucer can be closed. The fountain is supplied with water by taking out the stopper *c*, the entrance into the basin at *a* being at that moment closed; and, as soon as the water runs over at *c*, the cork or stopper of that orifice is put in, and the stopper at *a* removed. This pot is the invention of Mr. Saul of Garstang, who sent the above description, and the sketch from which the engraving is made, on Dec. 5., and who informed us at the time that he had had them both some weeks by him. — *Cond.*

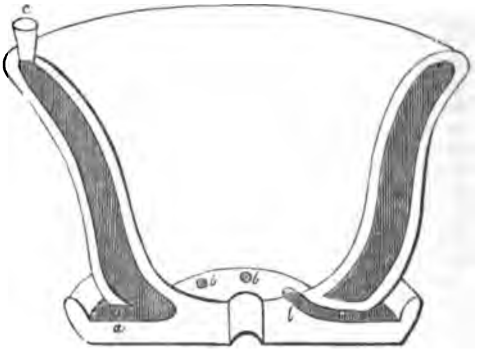

Fig. 17. *Saul's Fountain Flower-pot.*

Stephens's Plant-protecting Flower-pot, with double Rim, of which *fig.* 18. is a section, was sent to us by Mr. James Stephens of Carr House, near Doncaster, a gardener who has read this Magazine from its commencement. It was sent in April last, but we did not receive it till Dec. 29. This pot not only supplies the plant with moisture where it is most wanted, but serves as a plant-protector, as there are but few creeping insects that will venture to cross from one rim to the other when the space between is full of water. For plants that stand out in the open ground, Mr. Stephens has the pots made with two small holes, one on each side, half an inch from the bottom; and as there are no holes in the bottom, worms cannot get into the pots, nor can the roots of the plants root through these holes into the ground; advantages both of which are of no mean importance.

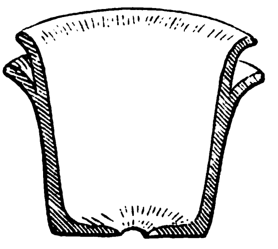
Fig. 18. *Stephens's Double-rimmed Flower-pot.*

Mr. Stephens, though he invented these pots, has no pecuniary interest in them ; they are manufactured by Robinson & Co., at Kiln-hurst, near Swinton Station, Yorkshire, at from one penny each upwards. Mr. Mearns of Leeds, and a number of experienced gardeners, Mr. Stephens informs us, declare this pot to be the most decided improvement hitherto made in flower-pots. — *Cond.*

A new Plough for raising Potatoes has been invented by Mr. David Goudie, overseer upon Hillhead Farm, near Kilmarnock. The implement somewhat resembles the grubber harrow, being held by two handles, drawn by two horses, and supported upon two wheels. Details will be found in the *Kilmarnock Journal*, in the *Stirling Advertiser* for October 14.; and the implement itself may be procured of Messrs. Drummond, Agricultural Museum, Stirling. — *Cond.*

The Scotch Pine, a Substitute for Candle. Distillation of Oil of Turpentine from its Roots. — The Pìnus sylvéstris, or native fir of Scotland, abounds with resinous matter and turpentine throughout its whole structure, which is particularly the case in the lower part of its trunk and roots. Dr. Howison, many years ago, when residing in and passing through various parts of the Russian empire, observed that the principal (or almost entire) light used by the peasantry in the northern departments was produced from slips or laths of the fir tree fixed horizontally, or in a slightly sloping direction, on iron stands, and set fire to at the lower extremity. These laths might be a yard in length, and of small diameter. Each one gave a flame of greater size than a candle, and continued burning for a considerable time, when its place was supplied by a fresh one. Might not the same method be followed in some parts of Great Britain? In the Highlands and northern islands of Scotland the peasantry use the extreme roots of the fir tree, dug out from the bogs and peat mosses, as a substitute for candle; and, in consequence of the quantity of turpentine contained in them, they burn with vivacity and splendour, furnishing a brilliant light. Around the cottages or isbas of the Russian peasantry Dr. Howison observed the large roots of the fir tree, dug from the earth after the trunk had been cut down for the numerous useful purposes to which it is applied, lying indiscriminately about. These were obtained previously to the falling of the winter snow, which remains for seven or eight months of the year. During the above period, when no other more valuable work can be obtained, the peasantry break them down into small pieces with hatchets, put them into a small still, and obtain oil of turpentine in large quantities at no expense, the exhausted slips, the refuse of the boiler, from which the turpentine has been already extracted, furnishing fuel for the future fire. The receiver is a glass bottle with a hole in its bottom filled up with a plug. When the distillation is over the plug is withdrawn, the water, falling to the bottom from its greater specific gravity, is allowed to escape, and the floating oil of turpentine is retained. The sale of the turpentine pays the expense of digging up the roots (which leaves the ground free for the plough), and allows a surplus for the labour. Might not the same be done by the unemployed labourers in some parts of Great Britain? — *H.*

The Stimulus of Competition in Agriculture. — Our great manufacturers have thriven under the sometimes too feverish and intense, but yet generally wholesome, stimulus of competition. We think it can hardly be said that of late years this principle has been brought sufficiently to bear upon the growers of agricultural produce. We speak of them, as a body, with the highest respect ; they are the very trunk of our social health and strength : may the day never come when they shall cease to be the first among the classes of the noble country they adorn! But to say that they require to be stimulated; to say that, unless stimulated, they will not use their utmost and sustained efforts to devise the means of economising production, and of selling as cheaply as possible; and further, that the stimulus they may afford to one another cannot, under all circumstances, be considered sufficient ; all this is merely to say that they are men, and that they are not wholly exempt from the common, the universal, infirmities of men. Let us look at the difference in private life between a frugal and a lavish expenditure; let us see how practically true it is, that equal means do not yield equal, but on the contrary yield most unequal, results; and we may then the more readily conceive that English agriculture has large resources as yet almost unopened, upon which it may draw in the time of need, and which will give ample scope for their exercise, before they have raised our average cultivation to the standard of the South-east of Scotland. (*Foreign and Colonial Quarterly Review*, as quoted in the *Morning Chronicle*, Jan. 14. 1843.)

Art. II. *Domestic Notices.*

ENGLAND.

The new Royal Gardens at Frogmore, which have already excited much curiosity in the horticultural world, are progressing very satisfactorily, and bid fair to surpass all existing establishments of the kind. The splendid range of metallic hothouses and greenhouses, which, when completed, will be nearly a thousand feet in length, begins to make a very conspicuous figure, several of the most able workmen in the employ of Jones and Clark of Birmingham (the contractors for the horticultural buildings) having been for many months past actively engaged on the spot. The west wing of the range, to the extent of more than 300 ft., is already nearly completed, and the corresponding portion on the other side is being rapidly proceeded with. In the centre of the range is a neat Gothic structure, designed for the residence of Her Majesty's gardener, and it is intended to form a noble terrace or carriage drive in front of the buildings, which, commanding a view of the entire range, will produce a very striking effect. When the several works now in hand are completed, they cannot fail to attract a large number of visitors, and particularly such as take an interest in horticultural pursuits. (*Sun.*)

Bicton Gardens in February, 1843. — I have now been a week in Exeter, and twice to see Mr. Barnes. The weather here is at present dry and seasonable; wind N. and N.E., with very slight frosts in the mornings; and there was a slight snow-storm or two at the beginning of this week. I am told there has not been here this winter sufficient frost to kill scarlet geraniums, petunias, *S*álvia fúlgens, and such like things. Where they are under the sheltered walls, they have kept flowering all the winter; as well as mignonette and many other things. Of course the soft free-growing plants in the open flower-garden were cut with the slight frost in the autumn, at the time the dahlias were cut. Camellias out of doors have flowered beautifully all the winter, as well as many of the beautiful scarlet and pink rhododendrons. Mr. Barnes informed me that a large plant of *R*hododéndron Noble*ànum* in the flower and American garden had on christmas day above 200 heads of bloom fully expanded; but the cold winds this week have turned some of them a little brown. The peach, apricot, and pear blossoms on the walls are getting very forward. I hope this fine but cold weather is in time to retard and keep things in their places. Mr. Barnes says he never found the ground to work so well as it does this season. There are still excellent pine-apples here, and a good succession coming on. I think I never before saw such a show of pine-apples, at this season of the year, as are now coming on here. The peach-house presents a splendid assemblage of blossoms, and the fruit seemingly setting well. Mr. Barnes's new potatoes are thoroughly ripe, and he has a good crop. Mushrooms, cucumbers, French beans, asparagus, &c., have been very abundant all through the winter, and still continue so. It is really very interesting to be amongst the plants here: the houses are very gay with bloom, and the plants are very healthy and vigorous. Heaths are growing like weeds. The camellia blossoms I never saw so large and perfect in form before. Mr. Barnes has grapes as large as marrowfat peas. The kitchen-garden has been turned upside down this winter, the whole of the box having been taken up and replanted in a regular manner: 500 cubic yards, equal to as many cart-loads, of marl and loam have been got in for the borders, &c., the greater part of which is already trenched in.— *W. Exeter, Feb.* 11. 1843.

The Lane-End Horticultural Society, exclusively for the encouragement of horticulture among labouring cottagers, is well worthy of imitation throughout the country. Premiums are offered for the first and second best cultivated gardens, and for the first and second best of all the commoner vegetables, fruits, and flowers. The premiums vary from 1*s.* to 5*s.* The place of exhibition is the schoolroom, and the clergyman and the schoolmaster are the principal judges.

The Chislehurst Horticultural Society for Cottagers is conducted on the same general principles as that of Lane-End, and is effecting for part of Kent, what the other is for part of Bucks. Very handsome premiums are given by the Chislehurst Society, and the Messrs. Barnes, and other first-rate gardeners, not only subscribe liberally, but contribute improved varieties of culinary vegetables, &c.—*S. T. Feb.* 1843.

Art. III. *Retrospective Criticism.*

PROFESSOR *Henslow's Lecture on Manures.*— I have your favour of the 27th instant, and the two Ipswich newspapers containing Professor Henslow's lecture on manures, and feel obliged by your attention. I have little to remark on the essay. Professor Henslow is cautious and prudent in his statements, and I agree generally with what he says. A great many, even of physiologists, seem to be of opinion that carbonic acid is the sole way of plants getting their carbon. This, I have no doubt, is the principal form in which they get it, though humic acid and organised substances, I think, cannot be excluded. If sugar, gum, and starch are stored up in the plant, to become again the food of buds in the spring and of seeds, does it not show that these and similar substances may be made useful? When soluble in water, and absorbed, where can be the difference? In seeds germinating and buds sprouting these substances are changed into carbonic acid; which, losing its oxygen in the leaf, gives rise to the nascent carbon of DeCandolle, necessary in forming the latex or blood of the plant which alone can furnish the products of assimilation; and what will prevent absorbed substances from being so transformed by the vital activity of the plant, as well as the same substances stored up in the autumn, and restored to the circulation in the spring?* The professor seems to lean to the opinion that the carbon is mostly taken up by the roots: he says carbonic acid and carbonate of ammonia are got from the air, and that they are absorbed by water, and carried into the soil, which is quite different from getting carbonic acid altogether by the leaves. If the carbonic acid is taken up by the roots, then there is some reason for depositing carbon in the soil; if wholly got by the leaves, and the atmosphere always contains the same proportion, then we may as well spread the carbon on the roof of the house as deposit it in the soil.

The professor seems to lean to the opinion that manure is best deposited unrotted. If we were sure of its rotting equally well in the soil, if the moisture and heat of the soil could be regulated so as to insure this, it would be an advantage. The contrary, however, is most often the case;

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* If organised substances are divided small enough to allow of their entering the spongioles of the root with the water, which they will do if soluble, the decomposing powers of the plant are sufficient to reduce these to the elements of food, as well as sugar, gum, starch, &c. If nascent carbon is needed, as well as nascent hydrogen and oxygen, the carbonic acid of these substances will furnish it as well as that of the soil or air.

and, as he himself says, the crop planted with fresh unrotted dung loses the benefit, and much is lost before another crop succeeds. The chemical preparation, or digestion, of the manure intended as the food of plants is, undoubtedly, best done in the rot-heap. If carefully managed, covered with mould, and kept as directed in the last essay, there should not be so much loss as the professor states, one half of the nitrogen. It is not convenient at all times to deposit fresh manure, and the carriage is much more expensive. If the heat is well kept down by frequent turning, and the washing away prevented, there should not be much loss. Putrefaction and fermentation are much more active in the heap than in detached portions. Fresh manure in the potato-drill, unless the season is moist, is often found quite fresh at the end of the year.

On the subject of nitrogen he notices only that got from the nitrogen of the manure in the state of ammonia; but this, though undoubtedly the principal, is not the only source of nitrogen. If, as asserted by Dumas and others, animals do not absorb nitrogen from the air, their nitrogen being wholly got from plants, it follows there must be some source of supplying the waste. Accordingly we find that, in the combustion of coal and wood, the hydrogen given off forms ammonia with the nitrogen of the air already deprived of its oxygen by combustion; and part is found deposited in the soot in the form of carbonate of ammonia, or sulphate, when the substances burned contain sulphur; part of the ammonia will also escape into the air: and thus combustion is a great source of nitrogen to plants, as in soot, gas liquor, &c., besides that to the soil by rain. Volcanoes are also a source of ammonia on a large scale, as noticed by Professor Daubeny. The eremacausis of Liebig (or slow combustion of substances) is also another source. Where the oxygen is partly got from water and partly from the air, the hydrogen set free in the one case, and the nitrogen in the other, will form ammonia. Professor Johnson seems to think that much of the ammonia said to be absorbed by charcoal, &c., should be ascribed to this source rather than to absorption. In the manure heap a good deal of the ammonia found is probably due to this source, as well as that of the nitrogenous substances it contains. Nitrogen is also soluble in small quantity in water; and the water of the soil absorbed by plants will, no doubt, afford a small portion of nitrogen. The common air absorbed by plants, and deprived of its oxygen by absorption, is another source, as noticed in our last essay. From all these sources the nitrogen is supplied to plants in sufficient abundance to enable them, on the other hand, to supply the wants of animals, which are now generally believed to be consumers rather than producers of nitrogen: they give it off principally by the urine, showing the great benefit of retaining this in the manure heap; but also waste it by perspiration and exhalation, as shown by the fetid smell of both these excretions.

Dr. Madden is of the same opinion as the professor, that sulphate of ammonia is very apt to be re-acted on again by carbonate of lime; and sulphate of lime and carbonate of ammonia are the result. If soils contain much lime or chalk, the benefits of urate or sulphate of ammonia may be greatly lost by this cause. Sulphuric acid is said to be as cheap in proportion as gypsum, where needed; but carbonate and humate of ammonia we should consider more beneficial to the generality of plants, though such as clover, pulse, &c., are more in need of sulphur. — *R. L. Kilmarnock, Dec.* 30. 1842.

Charcoal and Charcoal Dust. — In your Vol. for 1841, p. 254–5., it is said, speaking of charcoal and charcoal dust, that M. Lucas was the first to show the action exercised by the charcoal on vegetation; thus setting aside the Italians, among whom the Abbé Piccone and Professor Moretti have treated of it at length in vol. 2. of the *Biblioteca Agraria*, p. 70.—*Giuseppe Manetti. Monza, Dec.* 7. 1842.

THE

GARDENER'S MAGAZINE,

APRIL, 1843.

ORIGINAL COMMUNICATIONS.

Art. I. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the Conductor.

(*Continued from* p. 105.)

As we anticipated, we have received a variety of communications relative to the article on the uses of cemeteries in our last Number. In one circumstance almost all the writers agree, viz. in expressing their surprise at the great durability of human bones: of this durability, however, there can be no doubt. One correspondent, a medical man, has "seen bones in churchyards in a state of incipient decay," and he therefore concludes that there must be "an ascertainable period when the decay is complete, and the bones, as well as the flesh, are returned to dust." On this subject we would observe that, in crowded churchyards which have been in use perhaps for centuries, the bones have in all probability been frequently dug up and reinterred, and that the changes in regard to soil and moisture, in which they were placed each time of removing, must no doubt have had a considerable influence in accelerating their decomposition. Add also, that the soil of burying-grounds which have been long in use has been rendered so porous, as to be as permeable to water, and consequently to air, as sand or gravel. In short, it has become like the surface soil of a garden or a field which has been long cultivated and well manured; and every gardener knows that such soil is so porous, and so little liable to cohere even by pressure, that it may be used to fill in drains. We agree, therefore, with our correspondent, that bones have every chance of decaying sooner in a burying-ground that has been long used than in fresh soil; though we do not consider this a sufficient argument for continuing to bury in such grounds after they have been once filled. On the contrary, as the porosity of the soil must necessarily be as favourable for the escape into the atmosphere of the gases of decomposition, as it is for the sinking into it of rain water, it shows the much greater danger to the health of the living from burials in old burying-grounds than interments in new ones.

II. THE LAYING OUT, BUILDING, AND PLANTING OF CEMETERIES.

HAVING shown the uses of cemeteries, we shall next consider the mode in which the ground should be laid out or arranged, with reference to these uses.

The *situation* of cemeteries, as they are at present used, that is, interring several bodies in one grave, and placing coffins in vaults, ought always to be at a distance from human dwellings; but if only one coffin were to be placed in each grave, and that grave never again opened, but the cemetery when filled used as a public garden, its situation might be regulated solely by convenience; and, in general, the nearer the town, the more desirable it would be, both as a burial-ground and a promenade. Cemeteries, as at present used, ought to be in an elevated and airy situation, open to the north, but with a south aspect, that the surface may be dried by the sun; rather than with a north aspect, where the surface would be moist during the winter months. If the surface be even, it will be more convenient for interments than if it were irregular, whether by broken ground, rocks, or undulations. It should be as near the great mass of the population for which it is intended, as a due regard to their health will permit, in order to lessen the expense of carriage, and shorten the time of the performance of funerals and of visits by the living to the tombs of their friends; it ought to be conspicuous at a distance, because, from its buildings and tombs, it will generally be an ornament to the surrounding country, and an impressive memento of our mortality; and the outer boundary ought to be regular and simple, in order that it may be short, and consequently less expensive than if it were circuitous.

The *soil*, for reasons which we have already noticed, ought to be dry to the depth of 20 or 30 feet, or capable of being rendered so by underground drains. It ought not to be generally rocky, at least where deep graves are to be dug. As in decomposition a considerable quantity of moisture (sanies) is exuded, the greatest care ought to be taken not to form a cemetery over a stratum of soil which contains the water used in the neighbourhood for drinking. Not to mention numerous instances in London, as noticed in the *Report on the Health of Towns*, there is a churchyard near Kirkaldy in Fifeshire with a perpetual spring immediately without the boundary wall, the water of which, passing through a stratum under the graves, is said to be contaminated; and the burial-ground of St. Peter's Church, Brighton, cannot be used as such, on account of the proximity of the chalky stratum which contains the water that supplies the wells of the lower part of the town.

In situations where, from the flatness of the country or the nature of the soil, there is not an opportunity of draining to a great depth, care ought always to be taken to carry off as much as possible of the surface water by shallow underground drains placed under the roads, and under the gravel walks and green paths which separate the lines of graves. No drains can be made under those parts of the surface in which graves are to be dug, for obvious reasons. Many details of this kind, which need not be entered into, will readily occur to the practical man.

The prejudices of the living, in every country, are in favour of a gravelly, sandy, or chalky soil; and in such soils draining is not required. In strong clayey soil, like that of most of the London cemeteries, decomposition does not take place for a very long period, the fleshy part of the bodies being changed into adipocere.

The *extent* of a cemetery must, of course, depend on the population for which it is intended; the probable increase or decrease of that population; and whether one, or more than one, interment is to be made in the same grave. The data on which to form the necessary calculations are, that the average outside dimensions of a grave are 7 ft. by 3 ft. 6 in.; that the average dimensions of a grave, where a number of them are supposed to have gravestones, are 8 ft. by 4 ft.; and that the average deaths in a healthy population in the country are 2 per cent, and in crowded towns and cities 3 per cent, per annum. Thus, 20 graves will be required per annum for a rural population of 1000, and 200 per annum for a population of 10,000. An acre will give 1361 graves, which will afford a supply for nearly seven years; and three acres will serve for twenty-one years. At this latter period the town will probably have increased on the side next the cemetery, when the additional ground should be taken at a greater distance, and the old ground, when fully occupied, may be sprinkled over with trees, to be eventually used as a place of recreation for the living. The calculation, however, will be considerably different, if we suppose that all the graves are to be without head-stones, and consequently no longer than is necessary to admit the coffins. For this purpose, the average width of the grave at one end may be 2 ft., and at the other 20 in., and the length 6 ft. Taking the greater width, this will give 12 square feet to each grave, which will give 3630 graves to an acre, These graves in the London cemeteries are dug 15 ft. in depth, and ten coffins of poor persons are deposited in them. The common charge is 25*s*. for each coffin, or at the rate of the enormous sum of 45,375*l*. per acre. In some cemeteries as many as fifteen coffins are deposited in one grave, the depth in that case being 20 or 25 feet. We could name a cemetery in which forty-five coffins, we are assured, have been deposited in one grave.

The situation, soil, and extent being fixed on, the next consideration is the *boundary fence*, which ought to be such as to insure security from theft, and favour solemnity by excluding the bustle of every-day life, while a view of distant scenery is admitted to produce a certain degree of cheerfulness, and dissipate absolute gloom. In an open part of the country, where there are few buildings or public roads, an iron railing may be employed as a ring-fence; but, in a populous neighbourhood, a wall 10 or 12 feet high, strengthened by buttresses carried up above the coping, so as to give the wall an architectural character, may be preferable. The buttresses may be of two kinds: ordinary ones, merely for strengthening the wall, or forming piers to panels of open iron railing; and, in the case of cemeteries not laid out in beds or panels, higher and more massive piers rising conspicuously above the others, at regular distances, to receive stones having cut in them the numbers and letters used as indexes to lines for ascertaining the situations of graves, in the manner which will be hereafter described. The numbers and letters alluded to are at present in most cemeteries painted on the brickwork, which has a mean temporary appearance; or they are put on stones or labels of cast iron inserted in the soil, and rising only an inch or two above it, which are liable to be disturbed by the moving of ground. Though we entirely disapprove of this mode of laying out a cemetery, yet, as it is generally practised, we have thought it right to keep it in view. Where economy is an object, a hedge and sunk wall may be used as a boundary, and the best plant for the hedge is the common holly. There ought to be one main entrance; and, if the situation admits of it, a second entrance, for the admission of workmen, carts, &c., necessary for carrying on the executive part of the cemetery.

In *laying out the interior*, the system of roads and walks, the drainage, the situation of the chapel or chapels, and the arrangement of the graves, and of the marks which in large cemeteries, as at present laid out, are necessary at the angles of the squares, require to be taken simultaneously, and also separately, into consideration. There ought to be at least one main road, so as to allow of a hearse having ready access to every part of the grounds; and from this road there ought to be gravel walks into the interior of the compartments formed by the roads, walks, and the boundary wall; and, from these gravel paths, ramifications of narrow grass paths, so as to admit of examining the graves in every part of the grounds, without walking over any of them, and thus insure respect for the dead. We have already observed that all the drains that require to be made must be under these roads, walks, and paths, so as not to interfere with the graves; and the ranges of situations for graves must be determined before the roads, walks, and green alleys are fixed on, otherwise there might be a waste of ground. To be convinced of the bad effects of the neglect of surface drainage in a cemetery, it is only necessary to walk on the grass of that at Kensal Green during winter or spring.

The first point to be attended to, according to the present system, unless the cemetery should be a small one of only an acre or two, is to devise a system for *throwing the interior into imaginary squares or parallelograms*, which shall be indicated by numbers and letters on the boundary fence, and by marks inserted in the ground at their points of intersection. In cemeteries of moderate dimensions, more particularly if the form be rectangular, the marks at the intersections of the squares may be dispensed with; these intersections being readily ascertained when it is desired to find out the precise situation of any grave, by stretching lines across the cemetery from the letters and figures on the boundary fence. For example, suppose *fig.* 19. to represent a cemetery of five acres, with the letters A, B, C, &c., marked at regular distances on the end walls, and figures 1, 2, 3, &c., at the same distances on the side walls; then, by stretching one line from B to B, and another from 2 to 2, &c., the intersections of the strings will give the points B2, C2, &c.: but supposing the surface of the cemetery to be very hilly, or that it is thickly studded with tombs or trees, then, as the

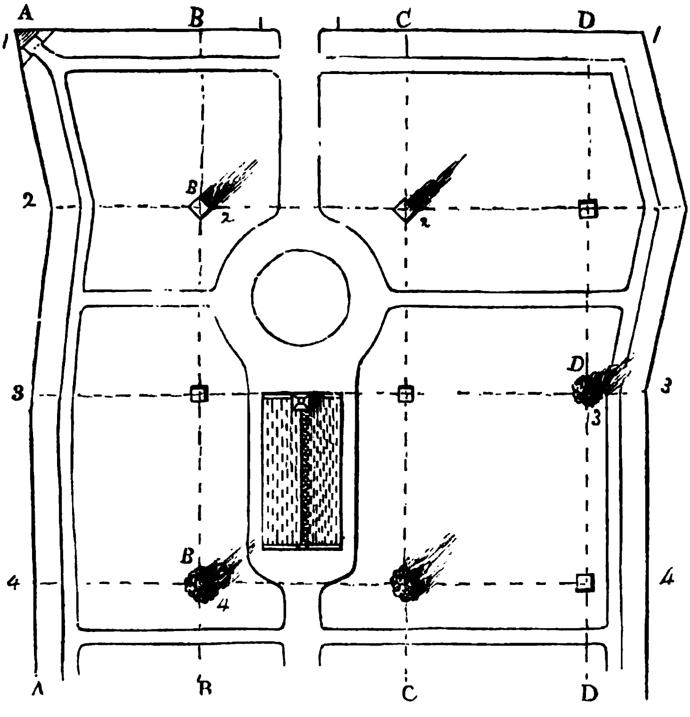

Fig. 19. *Mode of Laying out a Cemetery in imaginary Squares.*

lines could not be readily stretched so as to give the points B 2, C 2, &c., with perfect accuracy, a stone or mark of cast iron is inserted when the cemetery is first laid out, in each of the intersecting points, with the letter and figure on it, as shown in the diagram *fig.* 19. at B 2, C 2, D 3, &c. At every other point of intersection throughout the cemetery, there is a sunk stone or iron inserted, with the letter which stands at the ends of the long lines, and the figure which stands at the ends of the cross lines, as shown on a large scale in *fig.* 20. Thus in the diagram *fig.* 19., we should have the squares A 1, B 1, C 1, D 1, &c.; and A 2, B 2, C 2, &c. The use of these squares is to enable the sexton to ascertain and point out, at any future time during the existence of the cemetery, the precise spot where any interment has taken place. For example, required to see the grave of T. W. On turning to the index of the register book of names, T. W. is found to have been interred in the square B 4. Now, on turning to the map book of the cemetery, in which every imaginary square into which the cemetery is parcelled out is laid down on a large scale, the position and dimensions of the grave will be found delineated according to the scale; and then, by taking the dimensions from two of the sides of the square and applying them to the ground, the exact position of the grave is found, even though the grave mound should be obliterated. Now it must be evident that it would be exceedingly inconvenient to have the stone marks fall into positions where buildings were to be erected, or roads or walks to be laid out; and hence the propriety, as we have said above, of determining the position of the intersections of the squares, before any other part of the laying out is proceeded with. This is the more necessary in cases where the intersecting points are to be marked by trees of particular kinds, or by an obelisk, or other monumental stone. By using an obelisk or other pillar with four sides, pointing diagonally to the four squares, as at B 2 and C 2 in the diagram *fig.* 19., these stones would not only serve to indicate the intersections of the squares, but to record the names of those buried in each square, if the parties interested thought fit to incur the expense. It is not necessary that all the squares or parallelograms should be of the same size; on the contrary, their dimensions may be varied, so as to suit the ground, the boundary, and all the different circumstances connected with the general arrangement. In some cases the intersections of the squares might be indicated by trees, as shown at B 4, D 3, &c.

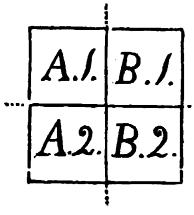

Fig. 20. *Showing the manner of marking the Stones at the Angles of the Squares.*

It must be confessed, however, that this system of laying out a cemetery into imaginary squares is a very unsatisfactory one, for the following reasons: — 1. It neither admits of a permanent system of surface drainage, nor of grass paths among the graves. 2. From there being no obvious principle of order or arrangement in conformity with which the graves are placed, the general aspect of the interior of the cemetery is confused and unsatisfactory; the graves and tombstones seeming to be put down at random as in common churchyards. 3. A very slight error in mapping the graves may render it difficult, if not impossible, to identify a particular grave, either to point it out to the relations of the deceased; or, when the square is nearly full, for the purpose of avoiding an old grave in digging a new one. Let any one who doubts this examine the map books in the principal London cemeteries, and ask to see one of the graves indicated in the plan. 4. Unless a head-stone is put to the grave, or some other permanent mark, it is impossible for any person but the sexton to identify it; which circumstance can by no means be rendered satisfactory to the relations of the deceased. 5. No provision is made for paths among these graves, so that, when the squares are nearly full, there will be no mode of getting to any one grave, but by walking over a number of others; which is not only a species of desecration, but, when there are several of the graves having head-stones, must be exceedingly inconvenient.

A much better system, in our opinion, is to lay out the ground in what may be called double beds with green paths between, in the manner to be described in a future paragraph, which has an orderly appearance, admits of a permanent system of surface drainage, requires no mapping, and enables the friends of the deceased to recognise the grave they wish to see without troubling the sexton or any one else. This laying out of the ground in double beds need not be so executed as to have a formal appearance, though it should be sufficiently distinct to give what, in the language of art, is called the expression of purpose, and thus give the lawn of a cemetery a different character from that of the lawn of a pleasure-ground. The double beds may be slightly raised in the middle, so as to slope to the grass paths, and the surface of these paths, if only 3 in. below that of the beds, will be a sufficient distinction, when the whole is near the eye; while, at a short distance, the difference between the beds and the paths will scarcely be perceptible. We mention these things to anticipate objections on account of the supposed formality of this plan. Under every green path there may be a tile drain, which will render it as dry as a gravel walk. The path will answer if only 3 ft. wide, because, in carrying a coffin along it shoulder high, that space is sufficient; but 4 ft. is preferable, as admitting of carrying a coffin by handspokes. Where the hand-bier, to be hereafter described, is used, a 2-feet path would be wide enough.

In making arrangements for the *situations of graves*, regard must be had to the wealth and taste of the persons who will probably use the cemetery, and the proportion of situations for sumptuous tombs and monuments adjusted accordingly. At the same time, we should mark no part of the ground as exclusively devoted to any class of society, of graves, or of monuments*; nor should there be any part in which a monument might not be erected. In general, we would form a broad border, say from 12 ft. to 20 ft. wide, along the main roads; a border immediately within the boundary fence, of the same width as the height of the latter; a border from 8 ft. to 12 ft. wide on each side of the gravel walks; and the interior of the compartments we would lay out in beds or zones, straight or curved, with green alleys of 3 or 4 feet between. These beds ought to be of such a width as to contain two rows of graves, with the head-stones of each row placed back to back in the middle of the bed, so as to face the alleys. The necessary width for this purpose is 18 ft.; which will allow 7 ft. for the length of each grave; 1 ft. at the head of each grave, on which to erect a head-stone, or other monument not exceeding 1 ft. in thickness nor the width of the grave; and 1 ft. at the end next the walk, for a foot-stone or number. This head-stone or monument, it may be observed, should in no case be built on the soil, but on two brick piers brought up from the bottom of the soil to the surface of the ground, in the manner to be hereafter described.

The direction of the *roads, walks, and green paths*, is partly a matter of necessity and partly of design and taste. Where the surface of the ground is hilly, undulating, or otherwise irregular, winding roads become necessary; but where the surface is tolerably even, whether a uniform slope or a flat approaching to a level, the choice lies between straight lines and curvilinear ones. The direction of the roads and walks, and consequently the whole of the interior arrangement of the cemetery, are thus in a great measure controlled by the character of its surface. In general, straight roads and walks are greatly to be preferred in a cemetery to winding ones, not only as admitting of a more economical occupation of the ground, every grave being a rectangle, and every rectangle being a multiple or divisor of every other rectangle, but as contributing far more than curved lines to grandeur and solemnity of effect. If all the roads cannot be made straight, there ought, if possible, to be one broad and straight road from the main entrance to the chapel. A winding road from the main entrance, with the chapel concealed by trees, has too much the character of an approach-road through a park to a country residence. The roads may vary from 12 ft. to 20 ft. in width, according to the extent of the cemetery; the walks should not be narrower than 5 or 6 feet, nor the green paths than 3 or 4 feet.

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* By the cemetery bill brought into parliament in 1842, " both in the consecrated and unconsecrated ground, portions are to be set apart for the poor, a hard-hearted and unchristian proposal, worthy only of barbarous times. Can it be necessary or useful, that now, for the first time, a ' distinctive mark ' should be made, after death, between rich and poor, by the express authority of an act of parliament? When even the propriety of distinctions in churches is becoming the subject of controversy, surely the good sense and good feeling of society will never suffer an unfeeling innovation in this respect to be formally legalised in our churchyards. He who has had familiar intercourse with the poor must have observed their sensitiveness with regard to their treatment after death, a subject often of more painful interest than the good or bad in store for them while living. Before the committee, the Bishop of London, much to his honour, expressed the most kindly sympathy with the feelings and prejudices of the poor with regard to interment: will he not set his face against the proposed regulation ?" (*Claims of the Clergy*, p. 30.)

The *chapel or chapels* ought to be placed in a central and conspicuous situation, so as, if possible, to be seen from all the prominent points of view along the roads and walks. The chapels, if there are more than one, ought either to be grouped together in one conspicuous situation, so as to form one pile of building; or placed so far apart, or in situations so different, that they either cannot both be seen from the same point, or that, if seen in the same view, the one shall appear to the eye so much smaller than the other as to appear as a part of the background of the picture. The bad effect, in an artistical point of view, of two chapels placed equally near the eye, that is, in the same plane of the picture, and so far apart as not to group together is strikingly exemplified in those of the Norwood Cemetery. At the main entrance there may be a lodge or lodges, in which the sexton or superintendant of the ground may reside, and in which also there ought to be an office for the cemetery books and plans, or duplicates of them, and for receiving orders for funerals, &c. One lodge will generally be found preferable to two, because, where lodges are of such a size as to be useful, and are widely separated by spacious gates, they attract attention as separate objects, and do not group together so as to satisfy the eye as a whole. If there are two separate lodges with intervening gates, the lodges ought not to be higher than the piers between the gates; and they ought to seem rather as massive terminations to the gates than as lodges, in short as a part of the façade. A striking example of the bad effect of two large lodges is afforded by the Nunhead Cemetery. The Abney Park Cemetery shows a judicious combination of two lodges with gates between; there is a very good single lodge at the west entrance to the Tower Hamlets Cemetery; and the Kensal Green and West London Cemeteries afford examples of the lodge and gateway combined in one edifice, the gateway forming an arch through it. Where it is considered absolutely necessary to have two lodges, either to a cemetery or to the park of a country residence, they ought to be combined with the piers of the gates, as at the Abney Park Cemetery; formed into one pile of building with the gateway, as at the West London Cemetery; or one lodge ought to be much larger and higher than the other, in order to form a central mass or axis of symmetry, or, in Hogarth's language, to form the apex of the triangle.

A *yard and sheds* for the cemetery tools, implements, and other cemetery furniture, including a carpenter's shop, may also be conveniently placed near the lodge; but where the cemetery is large there ought to be two or three sheds for planks, barrows, &c., in different parts of the ground. In most cases a reserve ground for spare earth, produced from time to time as brick graves or vaults are formed, for rubbish of various kinds, and for nursing plants to be placed over the graves when wanted for that purpose, may be requisite. On a large scale, a mason's yard with sheds is essential; unless, which is much the better mode, there should be an establishment of this kind in the immediate neighbourhood, by which all the brick and stone work would be done by contract.

On the introduction of *trees and shrubs* into cemeteries very much of their ornamental effect is dependent; but too many trees and shrubs impede the free circulation of the air and the drying effect of the sun, and therefore they ought to be introduced in moderation. They ought not, as we think, to be introduced in masses in the interior of the cemetery, nor in strips or belts round its margin, unless under very particular circumstances. Every mode of introducing trees and shrubs which is identical with that practised in planting parks and pleasure-grounds is to be avoided, as tending to confound the character and expression of scenes which are, or ought to be, essentially distinct. Independently of the injury done by masses and belts in impeding the free circulation of the air, they prevent the ground on which they stand from being occupied by graves; and though there may be no immediate occasion for so occupying that ground, yet an arrangement which seems to be at variance with, or at least to have no reference to, the purpose for which the cemetery was formed is unsatisfactory. There is evidently not the same objection to single trees or single shrubs; because, in whatever manner they may be placed, still, between and among them, graves may always be formed. There is a specific objection against boundary belts, which is, that they occupy a space that might be advantageously laid out as a broad border for tombs of a superior description, with a gravel walk in front accompanied by another border on the opposite side. For the same reasons that we would not introduce trees and shrubs in masses, we would not, in the case of cemeteries on low or level ground, plant trees which produce bulky heads; but confine ourselves chiefly to kinds having narrow conical shapes, like the cypress, the form of which not only produces little shelter or shade, but has been associated with places of burial from time immemorial. Almost all the kinds should be evergreen and of dark foliage; because the variety produced by deciduous and flowering trees is not favourable to the expression either of solemnity or grandeur. Evergreen needle-leaved trees, such as the pines, firs, junipers, yews, &c., we should prefer; because, when their foliage drops, it produces much less litter than that of broad-leaved trees, such as the holly, common laurel, evergreen oak, &c. On very hilly cemeteries we would introduce round-headed trees along with conical shapes, but still chiefly confining ourselves to evergreens, such as the ilex, Lucombe oak, holly, the dark-foliaged pines, &c.

Supposing all the roads, walks, and green paths laid out, or their situations fixed on, and all the beds and borders also laid out, then we would dispose of the trees and shrubs in the following manner. Along each side of most or all of the main roads, whether straight or curved, we would plant a row of trees parallel to the road, and at regular distances, so as to form a running foreground to the interior of the compartments, and to whatever there might be of distant scenery. The kinds should be pines and firs of dark foliage. In roads and walks in the direction of east and west, we would either plant the trees farther apart, or plant narrower-growing kinds, such as the common cypress, the Irish yew, the Swedish juniper, the fastigiate arbor vitæ, &c. At many of the intersections of the squares, in those cemeteries where that mode of division is adopted, we would plant provisionary trees, of a kind strikingly different from every other planted in the cemetery, in order to distinguish the angles of the squares at first sight, with the number-stone at their base, to be taken up when it became practicable or desirable to substitute obelisks, square pillars, or other monuments, for them. Along the centre of the beds adapted for double rows of graves we would plant trees or shrubs at regular distances, with the intention that, in this and in all other cases whatever, except along the main approach from the entrance to the chapel, the trees should be taken up and replanted, or removed altogether, when necessary, so as to suit the position of graves.

With respect to the kinds of trees, we would, with very few exceptions, plant only those evergreens which have naturally dark foliage and narrow conical heads, or which admit of being pruned with little difficulty into such forms; because such forms not only interfere less with ventilation, sunshine, and the performance of funerals, but, more especially when of a dark colour, are naturally, from their great height in proportion to their breadth, more sublime than spreading forms; as well as artificially so, from their being classically and popularly associated with places of sepulture. For the main avenue we should prefer *Pínus taúrica, P. Pallasiàna,* or *P.* nígricans; if the situation were} favourable, the evergreen cypress, or the *Juníperus* excélsa, found to be a very hardy conical tree; and, if very unfavourable, the red cedar, or the common spruce. The pines and spruce grow rapidly, and admit of being cut into cones as narrow as may be desirable; but, to render this cutting unnecessary, the red cedar, and some of the rapid-growing conical junipers, might be employed. Along most of the gravel walks, and along the centre of the double beds, we would plant for the most part only fastigiate shrubs, such as the Irish yew, Irish and Swedish juniper, *Juníperus* recúrva, and some other junipers, and the arbor vitæ, box, common yew, &c. We would not plant, as a part of the general plantation of a cemetery or churchyard, weeping willows, weeping ashes, weeping elms, or trees of that kind; because we think that these trees, being of such marked and peculiar forms, are best adapted for being used only occasionally, for particular purposes; and therefore we would leave individuals to select such trees, or trees or shrubs of any other singular shapes that they thought fit, and have them planted over their graves or tombs. Thus, while the general plantations of the cemetery maintained a uniform grandeur and solemnity of expression, the singularly shaped trees and shrubs employed by individuals would confer variety of character.

A cemetery planted in the manner described will have a distinctive character, and one quite different from that of any of the cemeteries that we have seen, either in London or elsewhere. These cemeteries, according to our ideas, bear too great a resemblance to pleasure-grounds. That they are much frequented and admired by the public is no proof that they are in appropriate taste, but only that they are at present the best places of the kind to which the public have access. When our public parks and gardens are extended and improved as they ought to be; when they are ornamented with fountains, statues, immense blocks of different descriptions of rock (named), and with models of celebrated buildings, as covered seats and places of temporary repose or shelter; when they abound in singing and other birds and aquatic fowls, and contain every variety of tree and shrub that will thrive, and many kinds of herbaceous plants; and when they are perambulated, during a certain number of hours every summer's day, by a band of music, as in some of the public gardens in Germany; then will the necessity, as well as the propriety, of having a distinctive character for cemeteries be understood and appreciated.

The planting of *flowers* in cemeteries is very general, not only in the margin of masses and belts, and in beds as in pleasure-grounds, but on graves. For our own particular taste, we would have no flowers at all, nor any portion of ground within a cemetery that had the appearance of being dug or otherwise moved for the purpose of cultivation. A state of quiet and repose is an important ingredient in the passive sublime; and moving the soil for the purpose of culture, even over a grave, is destructive of repose.

Nevertheless, as the custom of planting flowers on graves is common throughout Europe, and of planting them in beds is frequent in the cemeteries about London, arrangements for this purpose must be provided accordingly. We would never plant flowers or flowering shrubs in the margins of masses or belts, or in beds or patches that might be mistaken for those of a lawn or a flower-garden; but, to give them a distinctive character, we would plant them in beds of the shape of graves or coffins, raised above or sunk beneath the general surface, and only in situations and on spots where at some future time a grave would be dug. For example, two graves are seldom dug close together, but an intervening piece of firm ground is always left of width sufficient for forming a grave at a future time; the object being to have, if possible, at all times, firm ground for the sides of a grave which is about to be excavated. Now, on these intervening spots alone would we plant beds of flowers, or of roses, or of other flowering shrubs. When flowers, shrubs, or trees are planted on occupied graves, it is done by individuals according to their own taste. The most highly ornamented cemetery in the neighbourhood of London, as far as respects plants, is that of Abney Park, in which, as already mentioned, there is a complete arboretum, including all the hardy kinds of rhododendrons, azaleas, and roses in Messrs. Loddiges's collection; and in which also dahlias, geraniums, fuchsias, verbenas, petunias, &c., are planted out in patches in the summer season.

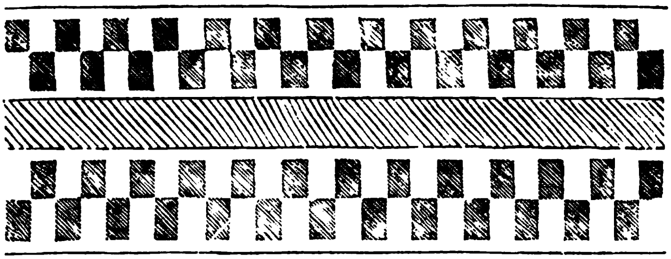

Fig. 21. *A Cemetery Walk with a Double Border on each Side, arranged with Beds for Shrubs or Flowers, alternating with Spaces for Graves having Tombs.*

Fig. 21. represents a walk with a double border on each side, the shaded parts of the border representing beds of shrubs or flowers, or of shrubs and flowers alternately, and the open spaces between being left for graves having monuments. When these spaces are filled up, those filled with flowers can be occupied. It is evident that this mode might be varied exceedingly, both in the form of the beds, and in the mode of planting them. (See *figs.* 22. to 28.)

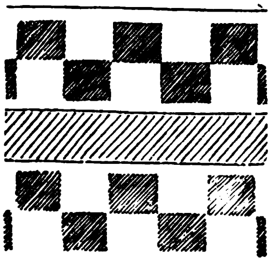

Fig. 22. *A Cemetery Road or Walk with Double Beds on the Borders, alternating with Spaces of double the usual Size, intended for Graves having large Monuments.*

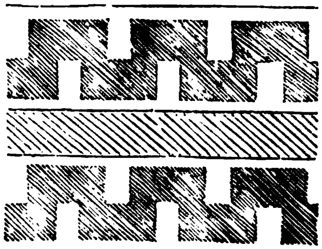

Fig. 23. *Double Borders with Masses of Shrubs, and Spaces for single Graves at regular Distances.*

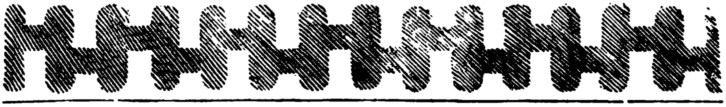

Fig. 24. *Beds of Flowers or Shrubs alternating with Spaces for Graves, for the interior Beds or Panels of Cemeteries.*

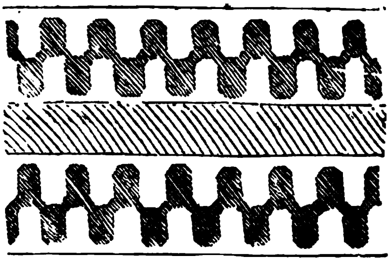

Fig. 25. *Double Borders, with Beds of Flowers or Shrubs alternating with Spaces for Graves.*

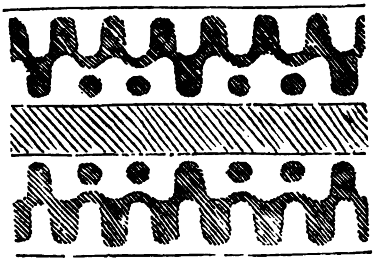

Fig. 26. *Beds for Shrubs, and Circles for Flowers.*

A mode of planting and managing which we should like to see tried with all or any of the systems of beds, *figs.* 21. to 24., would be to plant them with common yew, or with juniper, box, *Pinus* pumílio, or spruce fir, and keep the plants cut or clipped in such a manner as to form low, compact, architectural-looking masses 2 or 3 feet high.

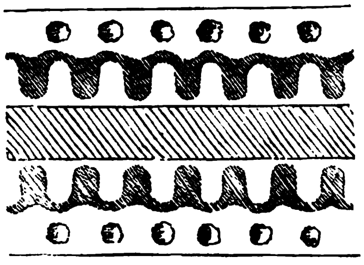

Fig. 27. *Beds for Flowers and single Shrubs or low Trees, such as Thorns.*

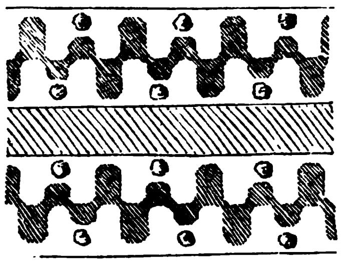

Fig. 28. *Beds for Flowers and fastigiate Trees, such as the Irish Yew, alternating with Graves.*

The *buildings* required in cemeteries may next occupy our attention. A chapel or chapels are generally required, because some persons prefer the burial service read under cover, or this may be rendered necessary by the state of the weather. The size of a chapel, therefore, should be such as to afford seats for the ordinary number of attendants at a funeral, with an open area in the centre, of sufficient diameter to hold two or more coffins on biers; and, as it is a general custom in Christendom to carry a corpse with the feet before, the body being brought in and set down on the bier in that position is, after the service is over, taken up by men and turned completely round, so as the feet may be in advance before it is taken out of the chapel. In addition, therefore, to the space necessary for holding the bier and the coffin, there must be room for turning the latter completely round, either while on the bier, which has long handles for that purpose, or on men's shoulders. A circle 10 or 12 feet in diameter, or a square that would contain such a circle, will afford ample space for these purposes, and the remainder of the chapel may be occupied with the pulpit, desk, seats, &c.

In the chapels of some of the new London cemeteries, instead of biers for the coffins, there is a table, the top of which has one or two spaces, each of the width of a coffin, filled in with rollers, and the entire top of the table turns on a pivot. The coffin or coffins, when brought in, are put on the table, by sliding them on the rollers; and, after the service has been performed, the table is turned round on its pivot, when the coffins being thus placed in the right position for going out are carried away by the bearers. The rollers facilitate the sliding on and drawing off of the coffins, and the turning of the table, by means of the pivot, saves the most difficult and awkward portion of the labour performed by the bearers, who, when not much accustomed to it, are apt to stumble, and create alarm in the mourners lest the coffin should fall. When a bier-table of this kind is used, the area left for it need not exceed 8 ft. in diameter, which will thus save 4 ft. in the entire length, and the same in the breadth, of the chapel.

A very convenient apparatus of this kind has been put up at the Kensal Green Cemetery. In the body of the chapel is a bier, in the form of an altar, about 8 ft. long, 4 ft. broad, and 4 ft. high, hung round with black velvet. The upper surface of this altar-like structure consists of a top for holding one or two coffins; and, to facilitate the putting on and taking off of these, this plate or top is furnished with rollers. After the desk service has been read, the top containing the coffin or coffins can be turned slowly round by machinery, operated on by a small movable winch handle on one side, which is done after the service has been read, when the interment is to take place in the open ground, or in the catacombs at a distance from the chapel; but, when the coffin is to be removed to the vaults under the chapel, there is machinery below, worked by a man there on a signal being given by ringing a small bell, by which the entire bier, and the coffin, or coffins which may be on it, are slowly lowered into a central area in the vault beneath. The mourners having descended by a staircase much too small for a chapel so magnificent in other respects, the coffins are carried from this area to the vaults, which radiate from it in four directions, and occupy nearly an acre of ground. The machinery by which the bier is lowered consists of two vertical male screws, worked by two female screws or nuts, which are moved by means of two beveled wheels set in motion by a man turning a windlass handle. This machine, while it lowers the bier through the floor, moves at the same time two horizontal shutters, which gradually close the opening in the floor as the coffin descends from the view of the spectators in the chapel; while, by the time they have arrived in the area below, the bier is already at the bottom, with the coffin on it, ready to be removed to the vault. The great advantage of using a screw movement for the descent of the bier is, that the motion can never be otherwise than slow and solemn, and that it cannot run down in case of the handle being set at liberty. This admirable contrivance was invented and executed by Mr. Smith, Engineer, Princes Street, Leicester Square, the patentee of an excellent window shutter, and of several other inventions noticed in our *Encyclop. of Cott. Architecture*. The cost was about 400*l.* In the Norwood Cemetery the same object is effected by means of Bramah's hydraulic press, which raises and lowers the bier with the slightest possible noise, and with a degree of steadiness which cannot be equalled by any other machine. The cost is about 200*l.* There is one drawback, however, to this machine, which is, that during very severe frosts the water is liable to freeze; but this may be guarded against by shutting all the outside doors of the vaults, and by the use of stoves. In ordinary winters, however, the latter are unnecessary. This machine was put up by Messrs. Bramah, Prestage, and Ball, 124. Piccadilly.

The number of sittings need seldom exceed fifty, at least in the neighbourhood of London, as it rarely happens that more than a fourth of that number attend a funeral. Whatever be the architectural style of the chapel, it ought to contain a bell, the ringing of which, when the hearse is approaching from the entrance gate to the chapel, may be considered as a part of the burial service. The bell ought to be placed in a bell turret, rising from one of the gables, so as to become a conspicuous feature, and distinguish the chapel from a cottage or barn, in the same manner as the chimney tops of a dwelling-house are characteristic of a human habitation.

The *entrance lodge* to a cemetery ought to comprise a room to serve as an office to contain the cemetery books, or, at least, the order book and register, and the map book, where, from the system of squares being employed, such a book is rendered necessary. In small cemeteries, and in common churchyards, where the sexton is also the clerk and registrar, all the books and other documents will be kept in a strong closet in this room; but, in large cemeteries managed by a court of directors, the books are kept by a clerk in the cemetery office in the town or district to which it belongs, and only an order book, and the register and map book, or duplicates of them, are kept in the lodge. *Fig.* 29. is a plan of the lodge and yard at the main entrance of the City of London and Tower Hamlets Cemetery; in which *a* is the porch; *b*, vestibule; *c*, committee room; *d*, strong closet; *e*, gate-keeper's room; *f*, bed-room; *g*, passage; *h*, coals; *i i*, water-closets; *k*, tool-house; *l*, house for planks, tools, carpenter's shop, &c.; *m*, coach-house; *n*, coal-shed; and *o*, yard. The architects of this lodge and cemetery are Messrs. Wyatt and Brandon. The most appropriate cemetery lodge that we know is the one at Newcastle by Mr. Dobson, a figure of which will be hereafter given. Mr. Dobson's lodge can never be mistaken either for an entrance to a public park or to a country residence.

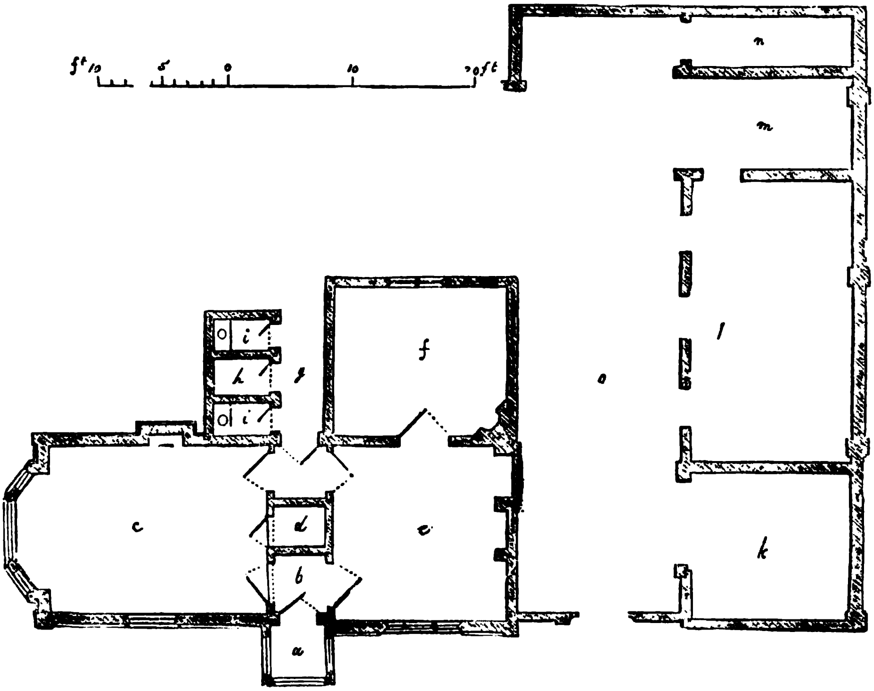

Fig. 29. *Ground Plan of the Entrance Lodge to the Tower Hamlets Cemetery.*

The other buildings or mural structures belonging to cemeteries are, vaults, catacombs, brick graves, tombs or other monuments, head-stones, foot-stones, cenotaphs, walls, and drains.

Vaults are commonly made under churches or chapels, but in the large cemeteries they are also made in the open ground, in deep excavations descended to by stairs, and ranged on each side of a passage or passages, which are lighted through iron gratings on the surface. One of the best examples, on a small and economical scale, is the public vault in the Abney Park Cemetery. The most classical situation for vaults is in the face of a steep rocky bank, where they require no drainage, and can be entered without descending more than a few steps; such as occurs in the St. James's Cemetery, Liverpool; the Sheffield Cemetery; and the Cathedral, or Necropolis, Cemetery of Glasgow. Catacombs above ground, like those in the London and Westminster Cemetery, like some private tombs in the Kensal Green Cemetery, and like those in the new burying-ground attached to the old church at Brighton, are, in our opinion, in bad taste; since the general idea of burial, no matter by what mode, implies the descent of the body below the surface of the ground. Private vaults for the use of a single family are commonly made of the width of two or three coffins, and of such a depth as to hold several placed one over the other, commonly with iron bars or plates of stone between, so that no coffin may have more to bear than its own weight, and the air may be allowed to surround them, to prevent them from rotting. Sometimes each coffin is placed in a separate cell, and closed up with masonry.

Catacombs. — Sometimes the vault is divided into cells like bins in a wine-cellar, by vertical divisions of brick or stone; and these cells are called catacombs, though the term is frequently applied to a vault or crypt not subdivided into cells. Each cell, when the coffin is inserted, is hermetically sealed by building it up with brickwork, or inserting a tablet of stone or marble, inscribed with the name, age, &c., of the deceased. In the new London cemeteries, the cells or catacombs are frequently only closed with an open iron grating, the end of the coffin being fully exposed to view. In some cases the cells are literally shelves, and the entire side of the coffin is exposed, as in the West London Cemetery. Both of these modes are attended with great danger to the living; whether by the bursting of the lead coffins from the expansion of the gas in the bodies within them, or from its escape through crevices in the lead coffin left accidentally, or through holes made on purpose by the undertaker under the brass plate, as already mentioned (p. 96.). When a private vault is formed on even ground in an open cemetery, steps are made for descending to it; and these steps are commonly covered by a flat stone, level with or slightly above the surface; or in some cases, as where the steps are under a walk or path, the stone is concealed under this. Over the vault is placed a monument of some kind, most commonly what is called a square tomb, as in *fig.* 30.; in which *a* is

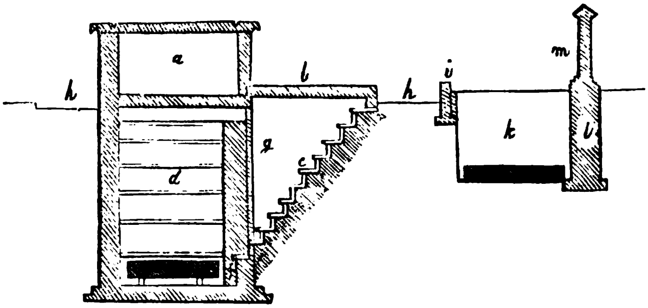

Fig. 30. *Section A B in the Plan fig. 33., through a Vault fitted up with Catacombs, and also through a common Grave, k.*

the tomb or superstructure; *b*, the cover to the steps; *c*, the steps; *d*, the catacombs or cells; *e*, a coffin placed in the lowest catacomb, and sealed up at *f*; *g*, a door of slate, flag-stone, or iron; and *h*, the grass alleys. In this figure is also shown a common grave; in which *i* is the foot-stone; *k*, the grave, containing a coffin at bottom; *l*, the basement wall to the head-stone; and *m*, the head-stone.

A *brick grave* is a substitute for a vault, and differs only from an ordinary grave in having the sides and ends of brickwork or masonry, and in being covered with a large flat stone, technically, a ledger-stone. These graves are generally purchased and built by heads of families. Sometimes they are of the width of two coffins, but generally of one; and they vary in depth from 10 ft. to 20 ft. or upwards. When an interment takes place the stone is loosened by levers, and removed by means of rollers; and, the coffin being let down as in common graves, the ledger-stone is replaced and cemented. The side walls are built concave next the grave, in order that they may act as arches against the exterior soil; and, in some cases, they are furnished with ledges which project 2 or 3 inches from each side, for retaining a flag-stone or slate between each coffin. When this flag-stone is securely cemented, the coffin below may be considered as hermetically sealed, though it is not very likely that this will be done so completely as to prevent the ascent of the mephitic gas. In other brick graves no ledges are projected, but one coffin is prevented from resting on another by inserting two bars of iron in the side walls, so as to support each coffin. When the coffins reach within 3 or 4 feet of the surface, the ledger is put on for the last time; and a putrid mass, of perhaps 15 ft. in depth, is left to generate poisonous air, which will escape, probably for years, through such crevices as may be left, or as may occur from the action of weather or other causes, between the ledger and the side walls on which it rests. The proper mode would be to fill in the uppermost 6 or 8 feet of the grave with earth. The names of the interred are inscribed on the ledger, in the order of their interment; or a monument of some kind is erected on it, of such dimensions, and in such a position, that it can be removed in one piece with the ledger, without being loosened or otherwise disturbed. In the Highgate Cemetery there are ledger-stones weighing with their monuments eight or ten tons, which are removed all in one piece every time an interment takes place. The more common mode, however, is to place a head-stone as a monument, as shown in the section, *fig.* 31. In this section, *a* is the side wall of the grave, here shown with openings to permit the lateral diffusion of moisture and mephitic vapour; *b* is the ledger or covering stone; and *c*, the head-stone. At one end is a common grave (*d*) with its foot-stone (*e*); and one of the two double green alleys, which form boundaries to the raised panel of graves, is shown at *f*.

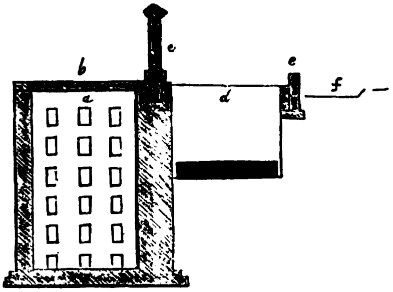

Fig. 31. *Section C D in the Plan fig. 35., through a Brick Grave and a common Grave.*

Brick graves are also used as earth graves, and filled to the surface with soil every time after an interment has taken place. The openings for re-interments should, as we have already mentioned (p. 96.), never be sunk to a greater depth than within 6 ft. of the last-deposited coffin; in which case no very great disturbance or danger from putrescence would take place, more especially in clayey or loamy soil, and when it is made a rule to ram the soil hard with a cast-iron rammer, to the height of at least 6 ft. above every coffin as it is deposited.* When the last-deposited coffin is within 6 ft. of the surface, the grave should be finally closed. Graves of this kind are not necessarily covered with a ledger-stone; they may be finished with a raised mound of earth, like a common earth grave, or the side and end walls may be finished with kerb-stones a foot above the surface, and the interior left level or planted with flowers. After the last interment, a cypress or other tree, or a strong-growing herbaceous plant, might be planted in the centre. The walls of graves of this sort should be built with numerous openings, as in *fig.* 31., to permit the lateral diffusion of the products of decomposition, and of the natural moisture of the soil.

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* Family graves, in some of the new cemeteries, are made from 12 ft. to 30 ft. in depth. We lately saw one in the Norwood Cemetery, which had been originally 20 ft. deep, and had one coffin deposited in it, after which it

Earth graves are of two kinds: *private graves*, in which only one body is deposited, with or without a monument; and *common graves*, in which several bodies are deposited, of poor persons, or paupers, for whom no monument is ever put up, except a mound covered with turf, but which ought always to be marked with a stone number for reference, and to prevent all risk of their being opened again at any future period.

Sepulchral monuments, whether mausoleums (which is a term only applied to the most sumptuous description of tombs), square tombs, ledger-stones with inscriptions, sarcophagi, pedestals, vases, urns, columns, obelisks, pillars, crosses, &c., to have the appearance of security and permanence, ought to exhibit two features; they ought to be perfectly erect or perpendicular, and they ought to rise from an architectural base. These features it is easy to exhibit when the monument is newly put up, but to continue them, even for a year, it is necessary to have a foundation of masonry under ground, as well as a basement above it; and, in order that this foundation may be permanently secure, it must be as deep as the adjoining grave or graves. In the case of vaults and brick graves, this secure foundation is furnished by the structure itself; but in the case of common earth graves a foundation requires to be built up, and the problem is how to effect this in a manner at once secure and economical. In most cemeteries and churchyards, and even in Père la Chaise and Kensal Green, the greater part of the monuments have no other foundation than the moved soil, and only comparatively few are placed on the firm soil. The consequence of this is, that, in two or three years after the monuments are put up, they are found leaning to one side; or, if they are composed of several pieces, they are seen with the joints rent, and conveying ideas the very reverse of permanence. Our remedy for the evil is, two brick or stone piers at the head of each grave, carried up from the bottom, and from 9 in. to 2 ft. square, according to the depth. The two piers should be brought up at the same time, and tied together by building in pieces of iron hoop; and, when within a short distance of the surface, they should be joined by a semicircular arch,

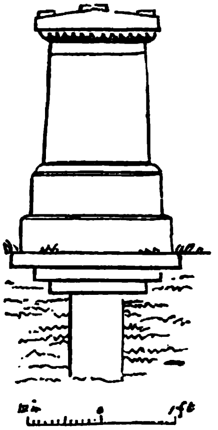

Fig. 32. *Pedestal resting on a 9-inch underground Pier.*

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was filled in to the surface with soil. It was, at the time we saw it, being opened to the depth of between 18 ft. and 19 ft., and the smell proceeding from the earth brought up was to us intolerable. This, and numerous other cases which we have witnessed, or which have come to our knowledge altogether independently of the Parliamentary *Report on the Health of Towns*, for 1842, or Mr. Walker's *Gatherings from Graveyards*, have strongly impressed us with the necessity of a law to limit the proximity of one coffin to another in graves in which more than one interment is made; unless, as before observed, the coffins are put in on the same day. (See p. 96.)

or carried up to the surface and connected by a lintel, which may be the visible base of the head-stone. Where a pedestal ornament of any kind not more than 18 in. on the side was to be put up, one pillar 18 in. square might suffice; or, when there was no danger of the ground being moved, even a 9-inch pier, as in *fig.* 32., would keep the pedestal from sinking. Where two graves were built end to end or side by side, three pillars would serve for both graves: and where four graves were to be made side by side and end to end, three pillars would suffice; or, in effect, two pillars, as shown in *fig.* 33., the two half-pillars at *a* and *b* not occupied being charged by the builder to the cemetery, which would have a right to sell them to those who made adjoining interments. These pillars may be built in a few hours, by having beforehand portions of them prepared with brick and cement in the manner familiar to every builder; or, in stone or slate countries, underground props of these materials might be formed; nor do we see any objection to cast-iron underground props. Where permanent endurance was the main object, we would not use cast-iron monuments ; as it is next to inpossible to prevent the rust from appearing through the paint, and scaling off so as to destroy, first the inscription, and next the body of the monument. In some of the London cemeteries temporary labels of wood, having on them the number of the grave or of the interment, and sometimes the name of the party interred, are used ; and where economy is an object, and durability to the extent of a generation considered sufficient, we do not see any objection to the use of east-iron tallies, such as *fig.* 34.; their lower extremities being so fixed to a piece of wood as to prevent them from being pulled out, while a circular disk, resting on two plain tiles or bricks, will prevent them from sinking. The cost of these monumental tablets at the foundery will be under 1*s*. each ; and the painting, and lettering, and fixing could scarcely, in any case, exceed 5*s*. each.

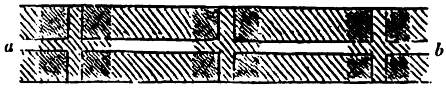


Fig. 33. *Double Foundations for Head-stones to be placed back to back.*

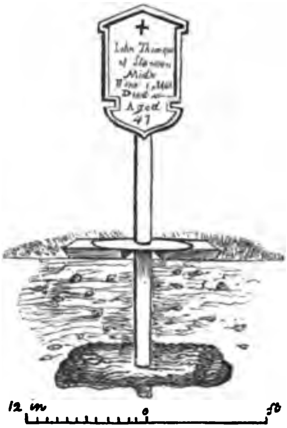


Fig. 34. *Monumental Tally of Cast Iron.*

It is in order to supply room for head monuments that we have reserved a space of 2 ft. in width between each double row of graves, as shown in the ground plan *fig.* 35. In this figure *a b* is the space between the two lines of graves, commencing and ending with a number-stone; *c c* are common graves with coffins, with piers for head-stones at *d d*, and spaces for foot-stones a foot in width at *e e; f* is a brick grave with two coffins inserted, the head-stone to be placed between *g g* and *d; h h* are spaces left for common graves, brick graves, or, by occupying four divisions, for vaults; *i*, a vault for two coffins in width, occupying four divisions; *k*, a vault for one coffin in width, occupying one division; *l l*, the green alleys between the double rows of grave beds or panels.

When it is in contemplation to have a double line of brick graves, or to fill up a cemetery regularly, without allowing a choice to the purchasers, as in the cemeteries of the Jews, then a foundation wall 2 ft. in width might be regularly carried up along the middle space, between the lines of graves, from one end of the line to the other.

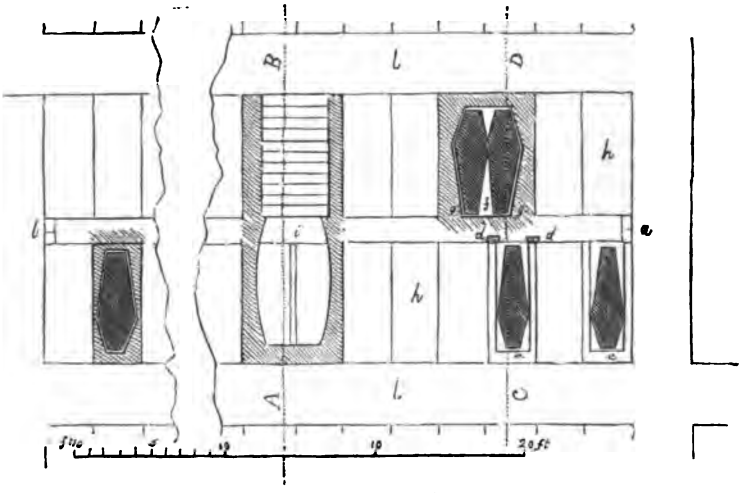


Fig. 35. *Plan of a Double Bed for the Arrangement of two Rows of Graves, with green Alleys between.*

Cenotaphs, as every one knows, are monuments put up to the memory of persons who are interred somewhere else. They commonly consist of tablets with inscriptions, medallions, busts, basso-relievos, or other sculptural objects, and are very fit ornaments for affixing to walls under cover, or protected by architectural projections, such as those furnished by a chapel, a cemetery veranda, a boundary wall, or a structure erected on purpose, as is not unfrequent in the French and German cemeteries.

Walls, when used as the boundary of a cemetery, and built of brick, may be carried up hollow, which will be a considerable saving of material, and render all piers unnecessary, unless for effect, or, in the case of cemeteries laid out in imaginary squares, the piers which are to contain the stones having the letters and numbers.

The *main conveying-drains* of a cemetery, if built of brick, should be barrel-shaped, in the usual manner; but, if of stone, the bottom should be laid with flag-stone, and the same description of stone should be used for the covering. *Main collecting-drains* may be formed by semi-cylindrical tiles placed on flat tiles in the bottom, and small stones placed over them to within a foot or less of the surface of the ground. *Surface collecting-drains* may be 20 in. deep, formed like the last, with tiles at the bottom, and carried up to the surface with small gravel, finishing with coarse sand; and, when these drains are in the green alleys, grass may be sown over them. When at the sides of the gravel walks or roads, they ought to communicate with surface gratings at regular distances; and immediately under each grating there ought to be a pit 1 ft. square and 2 ft deep to retain the sand carried in by the water (*fig.* 36.), this sand being taken out once a year. Where the roads and walks are laid with asphalte, gratings of this kind will be more necessary than when they are made of gravel, as a certain proportion of the water always sinks through the latter material, but none through the former.

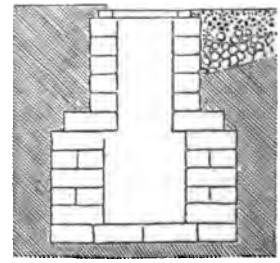


Fig. 36. *Cesspool under Grating, for retaining the Sand brought down by the Water.*

The *furniture*, or tools, implements, and temporary structures, of large and complete cemeteries, consists of picks, spades, shovels, levers, rakes, scrapers, brooms; a rope and pulley, or block and tackle, to be used with a triangle; planks, ladders, grave-boards, dumcrafts, grave-platforms, grave-boxes, grave-moulds, wheelbarrows, buckets for raising soil, a frame for supporting canvass or a tarpaulin over a grave while being dug during rain; and a temporary structure, consisting of a floor of boards or wooden grating, with three sides and a roof of canvass, rendered waterproof by paint, for the protection of the clergyman while reading the service at the grave; with another structure, of a larger size, for sheltering both the clergyman and the mourners. It is only necessary to notice in detail the grave-boards, the earth-boxes, and the temporary structures, as these are required in all burying-grounds.

The *grave-boards* are required in almost every case where the grave is dug more than 5 or 6 feet in depth, in order to prevent the sides from breaking down; and they are, perhaps, the most important implements connected with the cemetery. The ordinary custom is, to dig the grave 6 in. or a foot longer than is necessary; to introduce planks, one after another, as the grave advances in depth; and to keep them firmly against the sides by short pieces used as struts at the ends. An improved description of grave-boards has been devised by two superintendants of London cemeteries unknown to each other, viz. Mr. E. Buxton, superintendant of the Nunhead Cemetery, and Mr. Northen, superintendant of the Tower Hamlets Cemetery. In both improvements the side grave-boards are hinged, so as to form a concave side next the grave, by which means, when they are placed against the sides, they resist the lateral pressure in the manner of an arch. According to Mr. Buxton's invention, one board is put in beneath another as the grave is excavated, and each board is kept in its place by the end struts, which are driven outwards at each end of the grave: but, according to the practice in the Tower Hamlets Cemetery, the boards and end pieces are first joined together, and then let down from the top, one above another, as in well-sinking. The difficulty in both cases is to take the boards out, which must always be done by commencing at the bottom and proceeding upwards, the filling in of the earth over the coffin being carried on at the same time. Were the boards taken out from the top, the earth from the sides would be liable to fall in and bury some of the lower boards, or, in the case of graves 15 or 20 feet deep, it might bury the grave-digger. The grave-boards used by Mr. Buxton, the superintendant of the Nunhead Cemetery, are represented in the isometrical view *fig.* 37. They are in four parts: two sides, each of which is hinged on a beveled edge, which renders it impossible for them to get out of their places, and two ends which serve as struts to keep the sides apart. These ends are prevented from dropping out, by cutting the grave rather less than the intended width, and driving the ends, which act as struts, home with a large wooden hammer; in consequence of which they cannot be removed without the aid of a flat-ended lever bar. The sides are kept in their places by the pressure of the soil, against which they act as arches. The

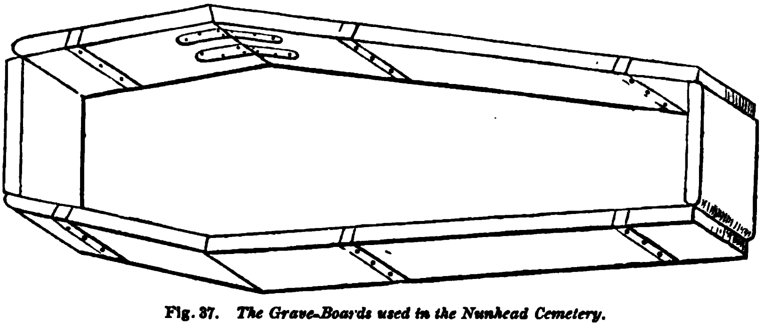


Fig. 37. *The Grave-Boards used in the Nunhead Cemetery.*

method of using these boards is as follows. The ground is opened about 1 ft. or 18 in. in depth; then the first pair of boards and ends are fixed, their upper edge being 12 or 18 inches from the surface of the ground. Next, at intervals of their own width, or closer, if the nature of the ground renders it necessary, another pair of boards and ends may be fixed, and so on till the grave is dug to the required depth. When the coffin has been deposited, the lowest pair of boards and ends are first taken out; and the remaining sides and ends are taken out in succession as the grave is filled. Mr. Buxton, to whom we are indebted for a small model from which our engraving was made, and who takes a deep interest in the Nunhead Cemetery, and in the subject of cemeteries generally, states that, by having the head and foot boards of different sizes, graves may be made of different degrees of width, as required for the different-sized coffins. The common length of the head board is 18 in., and of the foot board 16 in.; length of the side 5 ft. 2 in., and of the shorter portion 2 ft. 2 in.; making the total dimensions of the box, inside measure, 7 ft. in length; width at the shoulders, 2 ft. 4 in.: but by the use of different-sized head and foot struts, as before mentioned, any size required may be obtained. A great deal of labour in digging is saved by the use of these boards. It may be added, that a set of side boards are kept about 6 ft. in length, by which graves 5 ft. 9 in. in the clear are produced.

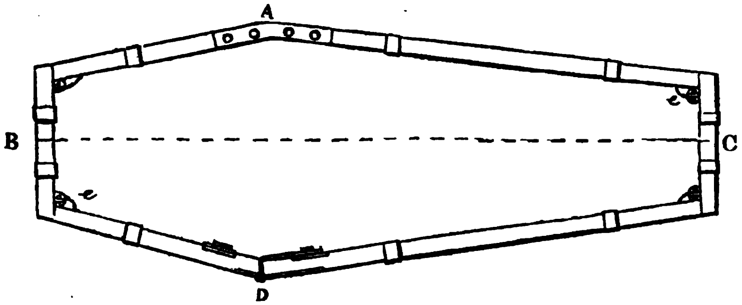


Fig. 38. *Plan of the Grave-Boards in use in the Tower Hamlets Cemetery.*

Fig. 38. is a plan of the grave-boards invented by Mr. Northen, as they appear when placed together in the grave. One side is hinged at D, and the other retained in its angular position by strong iron plates at the upper and under edge at A. Both boards are fastened to the ends by iron pins, which drop into eyes, as seen at the angles *e e*, and more distinctly in the sections *figs.* 43. and 44.

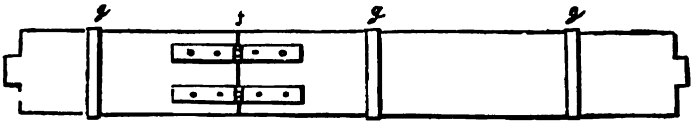


Fig. 39. *Elevation of the Side marked* D *in fig.* 38.

Fig. 39. is an elevation of the side D viewed externally, showing the hinges at *f*, and the iron hoops for preventing the boards from splitting at *g g*.

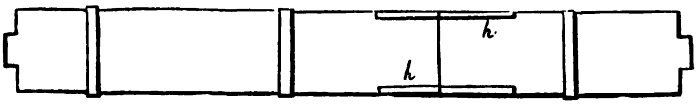


Fig. 40. *Elevation of the Side marked* A *in fig.* 38.

Fig. 40. is an elevation of the side marked A seen externally: *h h*, the top and bottom stiffening plates.

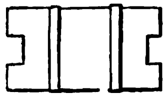


Fig. 41. *Elevation of the End* B *in fig.* 38.

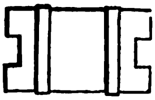


Fig. 42. *Elevation of the End* C *in fig.* 38., *which is* 2 *in. shorter than the End* B.

Fig. 41. is an elevation of the end B.

Fig. 42. is an elevation of the end C, which is two inches shorter than the end B.

Fig. 43. is a section on the line B C, showing the inside elevation of the side A: *i i* are rings for pulling out the side boards; *e e*, pins and eyes for fastening the ends to the sides; *h h* are the stiffening plates.

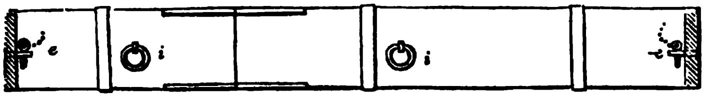


Fig. 43. *Section on the Line* B C *in fig.* 38., *showing the Side* A.

Fig. 44. is a section on the line B C, showing the inside elevation of the side D; *k*, an iron hasp which locks the two leaves of the side D, and prevents them from being pressed inwards. A latch of this kind is fixed on every other board on each side of the grave; and thus, when the board having the latch is loosened, the ends and the opposite board (*fig.* 40. A) readily drop out. The scale shown in this figure applies to it and to the preceding seven figures.

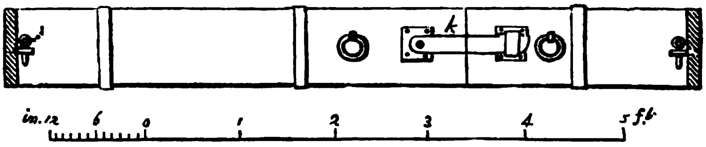


Fig. 44. *Section on the Line* B C *in fig.* 38., *showing the Elevation of the Side* D.

As the grave is being dug, one tier of boards fastened together, as shown in *fig.* 38., is first let down, like the kerb of a well in well-sinking; and as the work proceeds, and this frame sinks, another is placed over it, to sink in its turn; and so on, introducing one frame of boards after another, till the grave is dug to the proper depth. The last 18 or 20 inches at the bottom of the grave are not dug out quite so wide as all above, in consequence of which the boards do not go just so deep as the top of the coffin after it has been lowered. This admits of more readily taking out the boards, which is done by driving out the hasps *h*, and the pins *e*, beginning at the bottom and working upwards as the grave is filled. When the coffin is lowered, settled in its place, and the lowering ropes drawn out, the grave-digger descends to the bottom, and with a hammer drives out one of the hasps, which instantly loosens that board, allows of taking out the two ends, and consequently loosens the opposite one. In this way he proceeds from the bottom to the top, filling in the soil as he goes on.

The manner in which the grave-boards are kept in their position at Musselburgh, near Edinburgh, differs from that employed in most places, and is in some, if not in all, respects superior to it. It is the invention of Mr. Robert Gay, a smith in Musselburgh, and the superintendant of the burying-ground there. It consists in the application of the instrument shown in *fig.* 45., which about Edinburgh is called a dumcraft, and about London a screw lever. Two of these instruments, with the iron plates, spear nails, &c., screwed to the planks, which cost about 6*s*. 6*d*. each, are required for every pair of boards, one being applied at each end. A pair of boards, with a pair of dumcrafts fitted up complete, cost at Musselburgh from 20*s*. to 22*s*. The iron is made of ¾-inch rod, with a male screw at one end working in a female screw, to which

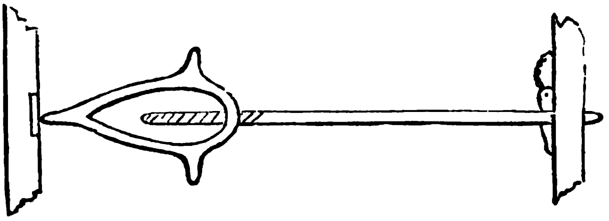


Fig. 45. *Dumcraft, or Screw Lever, in use in the Musselburgh Burying-Ground.*

wings having knobs are attached to facilitate working, and with the other end pointed and pierced about 3 in. from the point, so as to receive a spear nail. Every pair of boards requires a pair of dumcrafts; and one end of each board requires to have a hole about three quarters of an inch in diameter, guarded by a shield, for one end of the instrument; and, within a few inches of the other end, a plate of iron fixed on to receive the centre point of the screw, and allow it to work. By a mere inspection of the instrument, any workman will understand the manner in which it is to be used. The object of allowing one end of the rod to go through the boards is to allow the other end to come freely out when the grave is being filled up; for, although the dumcraft is slackened by unscrewing one end by means of the knobs which project from the wings, yet, by the pressure of the earth from the sides of the grave, it would take much longer time to loosen it sufficiently to get it out; whereas by turning the movable open part of the screw end a little, and then taking out the spear and allowing the iron rod to go through the boards, the centre point at the other end is freed at once, and this without any noise, which is not the case in taking out the strut pieces commonly employed. By having two or three holes for the spear, and two or three plates with centre holes for the screw to work in, a difference in length and breadth of grave may be obtained within certain limits. For an account of this instrument we are indebted to Mr. William Ballery, the superintendant of the Warriston Cemetery, Edinburgh.

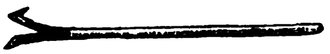


Fig. 46. *Cemetery Plank Hook.*

Fig. 46. is a cemetery plank hook, for dragging out loose planks used in the common mode of supporting the sides of graves, and for moving boards generally, when they are in a wet and dirty state.

The *grave-box* (Vol. for 1842, fig. 16.) consists of a bottom and sides, the latter readily separating from the former; and its use is to hold the soil dug out of the grave, till the grave is ready to have the soil returned to it. From one to four boxes are required for a grave, according to its dimensions. Their use is two-fold: to preserve the soil from mixing with the grass, from which it is difficult afterwards to separate it so entirely as not to leave a quantity of it entangled among its leaves; and to return the earth in the most rapid manner to the grave. The box, before receiving the earth from the grave, is placed alongside, and raised up in a sloping position; the earth is thrown into it; and as soon as the coffin is lowered the grave-diggers loosen and take out the side of the box next the grave, when the soil immediately begins to drop out, while, by raising the other side of the box, the whole is returned to the grave, and not a particle of earth is to be seen on the surface of the grass. This box was first used by Mr. Lamb, an undertaker in Leith, and is now in general use in the burial-grounds about Edinburgh. There ought to be a number of such boxes for every cemetery; and it would be an improvement to place them on low wheels, say those on the side which is to be next the grave of 6 inches in diameter, and those on the opposite side of double that height. This, while it would save the trouble of propping up the boxes, would also enable the grave-diggers to wheel them away, one after another, as fast as they were filled, and, when the grave was completed, to leave it quite free on every side for the approach of mourners, who would in this case walk on the turf, instead of walking on loose earth or planks. This result is sometimes obtained by throwing all the excavated soil into wheelbarrows, and removing these to a short distance, there to stand till the coffin is deposited. Either of these modes is much better than the common one of throwing up the soil on each side of the grave, and obliging the coffin-bearers to clamber over it. As the grave-boxes are readily taken to pieces, they can be stowed away, in sheds or tool-houses, in little space.

The *grave-platform* is a flooring of boards about 10 ft. long by 5 ft. broad, with an opening in the middle, of the shape and dimensions of an ordinary-sized coffin. It is hinged, so as to fold together lengthwise. Its use is to place over the grave, after the soil has been removed in boxes or barrows, for the double purpose of forming a guide to the lowering of the coffin, and a floor for those who lower it, who in Scotland are commonly the relations or mourners, to stand on. In most cemeteries loose boards, or two or three boards nailed together so as to form a platform, are laid down on each side of the grave, leaving the ground at the end of the grave uncovered; but this arrangement is far from being so complete and commodious as a hinged platform.

The *grave-cover* is a low roof of light boards, or of a frame and canvass, of dimensions sufficient to cover the opening of a newly made grave, and with handles like those of a hand-barrow, to allow of carrying it readily from place to place. Its use is to exclude rain or snow; and also, in the case of a very deep grave, to guard against the danger of persons approaching too near its edge. In large cemeteries it is found convenient to have at all times two or three graves prepared, both common graves and brick graves, ready to admit of interments on the shortest notice. The unoccupied brick graves are commonly protected by the ledger which is to constitute their permanent cover and finish, but the common graves are protected from the weather by the portable cover described.

The *grave-mould* is a box without either bottom or top, but with the sides and ends shaped like a coffin, to serve as a guide to the form of the grave-ridge, or mound of earth raised over a grave immediately after interment. When the grave is filled to the brim and properly rammed, the box is placed over the soil, and more is added and firmly rammed till the box is full, when the soil is raised in the middle, and rounded off in the manner seen in all neatly kept churchyards. Afterwards the grave-ridge is covered with turf, or planted with flowers. In some of the London cemeteries the stone-crop is planted on the grave-ridge, and forms a very neat evergreen covering, always within bounds. Some of the evergreen saxifrages might be used for the same purpose; and a friend has suggested that the common thrift would be an excellent plant, as its thick mass of dark green grass-like foliage would contrast with the light green of the grass forming the common covering of the cemetery. Where economy is an object, grass inoculation or grass seeds might be resorted to.

A *clergyman's shelter* is unnecessary where a tarpaulin or a movable shed is used over the grave; but, where this is not the case, it may be formed of five pieces, viz. A flooring of boards, or, to prevent slipping when the boards are wet, as well as to render the floor lighter, of wooden grating, raised one or two steps above the general surface, in order to give the reader of the service a more commanding position. To this floor three sides, each consisting of a frame of canvass, are readily fixed by means of studs in the lower rails of the sides, dropping into holes in the framework of the bottom; and they are as readily connected together by hooks dropping into eyes. The roof-piece, which ought to be raised a little in the middle to throw off the rain, can readily be dropped on four iron bolts, fixed in the upper ends of the styles of the sides. The whole may be painted black; and, when not in use, it should be taken to pieces, and kept in a dry airy situation. A tent or movable structure, to cover not only the clergyman but the mourners assembled, either during rainy weather or hot sunshine, might be formed without difficulty, and at no great expense. The framework might be light iron rods; and the canvass might be so arranged as to be drawn up and let down like the awnings to tulip beds, or the outside gauze shades to hothouses. (See *Sub. Hort.*, fig. 115. p. 175.)

The other articles of cemetery furniture having nothing particular in their construction, and being in use either by mechanics, ground workmen, or cultivators of the soil, do not require farther notice.

Roots and Plants.— In some of the London cemeteries dahlias are planted in the summer season, and these are kept through the winter in the unoccupied catacombs, and, with geraniums and other greenhouse plants, are brought forward in spring in frames in the reserve ground, or in some other concealed part of the cemetery, or perhaps in an adjoining garden or nursery. In the reserve ground of the great cemetery at Rouen, there is a large greenhouse, and the curator lets out plants in pots during summer at so much a pot, undertaking to keep them watered and trimmed, to decorate graves and monuments.

(*To be continued.*)

ART. II. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 113.)

LETTER XII. *Reasons for following the Business of a Market-Gardener.*

HAVING sent you a rough description of a few things contained in these noble gardens, before I commence giving you my method of growing, training, &c., my fruit trees and plants, I will tell you my reasons for following the business of a market-gardener for so many as twelve years. Hearing, when a boy, gentlemen's servants and others that had been in London talk of having there seen such fine and early fruits and flowers, I always felt anxious to go there to see them grow; and I started when quite young for that purpose, and got work with a noted cucumber and mushroom grower; a good grower too of grapes, pines, and melons, and a forcer of all early fruits and flowering plants. I stopped there more than four years, until I thought there was nothing more to learn. I next went as framer to a large market-gardener, quite on the other side of London; where I had the charge of 1000 lights of framing, 2600 hand and bell glasses for growing cucumbers, melons, early potatoes, &c., forcing asparagus and sea-kale in an extensive way, and fourteen acres of beautiful ground for vegetable-growing, under the spade, managed in a first-rate style as to cropping and the general management of it. I remained there until I thought I knew all I wanted, and then went to a very extensive grower of grapes, peaches, pines, strawberries, mushrooms, and all kinds of salads, fruits, and vegetables. I from there went to an extensive general grower of out-door fruits; having twenty-six acres of cropping ground under the spade, with more than 600 lights of framing for the early forcing of various things, and about 1200 hand and bell glasses; so that, in those twelve years, I had the opportunity of seeing the different methods of sowing and growing, from the commonest vegetable and salad to the most rare and expensive fruits. Market-gardeners, generally speaking, are the most industrious persevering class of men I ever met with; but they are at an enormous expense, and subject to very heavy losses. Nobody has an idea to what expense they go; and their men (taking the year through) I consider to work harder, and to have more hardships to contend with, than any other class of men I have ever met with. Two thirds, or more, of the men are Irish; at least they were so at the time I followed that kind of business; and I never met with more than one Scotchman amongst them as a workman. I have kept an account of the expense of working one acre of ground under the spade, reckoning the rent, taxes, manure, horses, &c., and getting the produce to market, and I found it averaged *50l.* per acre.

I have heard hundreds of people complain of being tired with working; but they never knew what it was to follow market-gardening for one year in the neighbourhood of London. If they had done so, they would soon have found out what it was to be tired. I have worked, and been paid, at the rate of ten days a week; and generally made, at some work or other, eight days all the season, for some years, out of my time. I could sleep as well riding on the top of a load all through London to Covent Garden as I now can on a bed, and have done so many times; and sometimes then what little sleep I did get was on the pavement in the old market, amongst vegetables, and before the business of the market began, and I never thought it any hardship.

The method the market-gardeners have of cropping and changing their crops is astonishing to many. For instance, you will see a large space of ground cropped, and arrived at the greatest state of perfection one day, and in about three days afterwards you will see it all gone; the ground manured, trenched, and cropped, almost in the space of time a West-Country man would turn round to reply to a question.

Some of them pay their workmen ready money every night; others three times a week; others twice a week, and some every Saturday evening. The reason why we find so few of these workmen afterwards as gentlemen's gardeners (in my opinion) is, first, that, if a man is a scholar, he thinks he can make better use of his time than following market-gardening;

secondly, he is frightened at the thoughts of the hard laborious work he will have. It is of no use for any man to think of going to work in a market-garden, that has not made up his mind to persevere and be industrious, and to make himself generally useful; no skulking about is ever suffered there. I used to find it a difficult matter to procure a good lodging; I have paid more than one fourth of my weekly earnings for one, and then had my cupboard sadly pillaged and robbed.

The next subject I shall address you upon will be my method of growing and forcing mushrooms; they spring out of the earth so quickly, and they are a very useful vegetable indeed.

Bicton Gardens, Oct. 31. 1842.

Art. III. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the Conductor.

The principles which serve to guide us in laying out the details of a place are derived from its natural and artificial character, and the wants and wishes of the proprietor. By natural character is to be understood the condition of the situation in respect to climate, the kind of surface, the nature of the soil, subsoil, rock, and springs, ponds, rills, or other forms of water, or the sea. By artificial character we mean the style of the architecture of the house, the present state of the ground as far as art is concerned, and the various topographical circumstances; such as roads, trees, neighbouring houses, cottages, villages, manufactories, &c. The wants and wishes of the proprietor require to be attended to no less than the character of the ground and the locality. An important object, in the first place, is to ascertain the extent to which he will go in regard to expense. Next his peculiar taste and that of his family are to be studied, and, as far as practicable, accommodated; except in the case of what the artist considers bad taste. In this case he must respectfully submit his reasons for what he proposes, and endeavour to argue the matter with his employer. Should he fail in producing the conviction desired, it will be a question for him to resolve how far he can, consistently with his own reputation, sanction the production of what he considers in bad taste; at the same time carefully distinguishing between taste which is inherently bad, and taste which is merely peculiar. For example, suppose an employer wished to terminate a vista with a landscape painted on canvass; or to introduce, in a verdant scene, a flat surface of boards painted so as to resemble a rock or a cottage? This taste, except in the garden of a *guinguette*, we should consider as radically bad; and should respectfully protest against it in the pleasure-grounds of a private gentleman.

Bearing these data in view, there are *three styles or systems of art*, according to which lawns and shrubberies may be laid out. The first of these is *the geometric style*, characterised by lines which require to be drawn geometrically; that is, on paper by the aid of a rule or a pair of compasses, and on ground by similar means; the second is *the picturesque style*, characterised by that irregularity in forms, lines, and general composition, which we see in natural landscape; and the third is *the gardenesque style*, characterised by distinctness in the separate parts when closely examined, but, when viewed as a whole, governed by the same general principles of composition as the picturesque style, the parts, though not blended, being yet connected.

The geometric style admits of several varieties, according to the prevailing features. In one case architectural objects, such as stone terraces, steps, parapets, stone edgings to beds, stone margins to basins, may be prevalent;

and this will constitute *the architectural style*. In another, statues, vases, and other sculptural objects, may be frequent in a geometric garden, and constitute, of course, *the sculpturesque style*. Where the trees and shrubs are for the most part cut into artificial shapes, whether architectural, such as walls (hedges), arcades, pyramids, &c., or sculptural, such as statues, vases, and other tonsile works, the result is *the tonsile style*, or verdant sculpturesque. Where stone terraces, terrace gardens, and sculpture are combined, the result is *the Italian style;* and grass terraces, turf mounts, and straight canals constitute *the Dutch style*.

The picturesque style varies according to the natural character of the surface, and the kind of art employed. It may be the hilly, the rocky, the aquatic, the trivial or common, or the elegant or refined, picturesque. *The trivial picturesque* may be applied to garden scenery in which only the common trees and shrubs of the country are planted, and the grassy surface is left, like that of a common pasture, without either the wildness of the forest glade, or the smoothness and polish of the lawn. *The rough picturesque* is exemplified in a surface more or less irregular or broken, among the grass of which ferns and other strong-growing plants spring up along with low shrubs; such, in short, as we see on the margins of forest glades, where the bushes have been kept down by the browsing of cattle and sheep. *The elegant or refined picturesque* is exemplified in lawns and pleasure-grounds, where the surface has been reduced to smooth undulations, levels, or slopes, and where the trees and shrubs grouped on these surfaces are of exotic species, or of such varieties of the common kinds as are not frequently to be met with. Other varieties of the picturesque, resulting from rocks, water, &c., will readily occur to the reader.

The gardenesque style is to gardening, as an art of culture, what the picturesque style is to landscape-painting, as an art of design and taste. All the trees, shrubs, and plants, in the gardenesque style, are planted and managed in such a way as that each may arrive at perfection, and display its beauties to as great advantage as if it were cultivated for that purpose alone; while, at the same time, the plants, relatively to one another and to the whole scene or place to which they belong, are either grouped or connected on the same principles of composition as in the picturesque style, or placed regularly or symmetrically as in the geometric style. Hence there are two distinct varieties of the gardenesque, *the geometric gardenesque*, and *the pictorial gardenesque;* and of each of these there are subvarieties arising from the use, in connexion with them, of architecture, sculpture, common trees and plants, or exotic trees and plants, &c. *The tonsile style*, however, can never be united with the gardenesque, because it violates the fundamental principle, that of allowing each plant to grow in such a manner as to come to perfection; nor will *the picturesque*, because in that style every tree and shrub is left, unpruned, to assume the form which it takes by nature, or which it may be forced to assume by its connexion or grouping with other trees and shrubs.

Mixed Styles.—Two or more of these styles may be employed in the same pleasure-ground, but not indiscriminately mixed there. When more than one style is employed, it can only be done with a good effect by using the styles in succession, in different parts of the same pleasure-ground. For example, the Italian style may prevail on the lawn front of the house, and may lose itself in grass terraces of the Dutch style; beyond which may be exhibited, first the gardenesque, and then the picturesque; but to introduce alternately portions of geometric or tonsile scenery with picturesque scenery would distract attention, and be destructive of that first of all principles in composition, the unity of the whole, which can only be produced by the connexion and harmony of the parts. Such scenery cannot be rendered tolerable otherwise than by being the effect of neglect, and exhibiting the character of a garden in ruins; of which there are a few fine specimens in the country, produced by only partially keeping up scenery originally in the tonsile style.

It is much to be regretted that the tonsile style is not occasionally revived, for the sake of variety, and the striking effect which it would produce from its novelty. At present, the most general mode of laying out pleasure-grounds, whether on a small or on a large scale, is to adopt the architectural, or the Italian, style, immediately on the lawn front of the house; and, where this style terminates, to commence either with the picturesque or the gardenesque style. We shall illustrate these two modes by two sketches. *Fig.* 47.

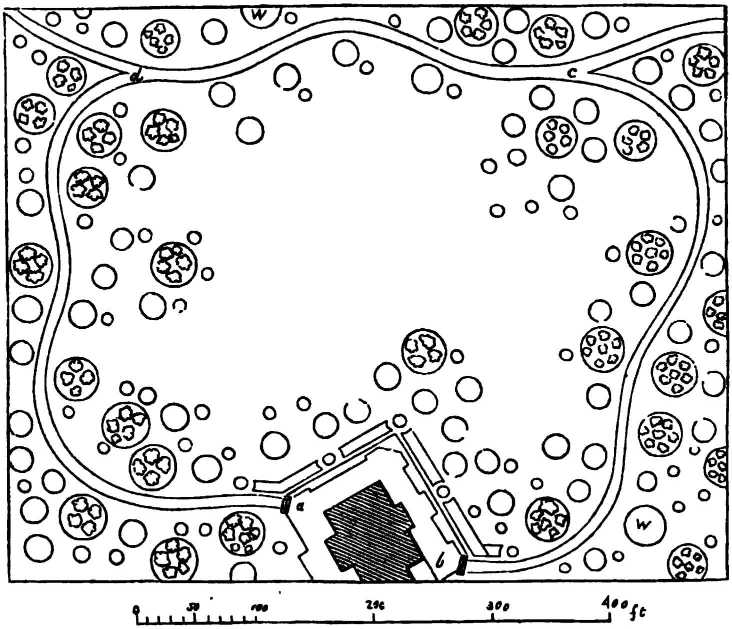


Fig. 47. *A Lawn laid out in the Gardenesque Style.*

represents a small pleasure-ground, laid out in the gardenesque style, with the trees and shrubs in vertical profile; *a b* represents a terrace-garden, embracing the house on three sides; the fourth being the entrance front. The general surface of the ground is supposed to be flat, but the terrace is raised 6 or 8 feet above it, as indicated by the steps at *a* and *b*. At the base of the steps, the ground may be supposed to be 3 ft. above the general surface, whence it slopes gradually till it becomes united with it. A walk commences at *a*, and is continued by *d* and *c* to *b*. On the supposition that the grounds are more extensive than is shown in the figure, a second walk commences at *d*, and is continued through a shrubbery to the kitchen-garden and farm, from which it returns by *c*; so that either a long walk or a short one may be taken without going over the same ground twice. There are two circles marked *w w*, which represent basins of water for watering the beds, and for a few of the most showy water plants. All the beds are circular, and vary in diameter from 18 in. to 3 ft. All the naked circles are supposed to be planted with flowers, one kind in a bed; or temporary shrubs, such as roses, cistuses, &c.; while the others are planted chiefly with flowering shrubs, some beds containing among these a low or fastigiate tree. The greater number of the shrubs are supposed to be rhododendrons, azaleas, kalmias, lilacs, roses, cistuses, and other shrubs which make a great show when in flower, and form compact bushes at all times.

In a number of the small circles, standard roses and dwarf or trailing plants grafted standard high, such as Cotoneáster *b*uxifòlia, Halimodéndron argénteum, &c., are supposed to be planted, in order to combine to a certain extent the singular with the gardenesque; but the great object, in laying out and planting this lawn, is to exhibit a blaze of flowers from the windows of the house and the surrounding walk.

It may be necessary to observe that it is not essential to the gardenesque that the beds should be circular; they may be of any other regular form, and they may even be irregular: but the circular shape is by far the best for entering into composition, either with one another or with scattered trees or shrubs; and what gives it a decided preference over all other forms is, that it is best adapted for culture.

Fig. 48. is a plan, with the trees in elevation, of the same space of ground as in *fig.* 47. It is laid out chiefly in the picturesque style, but combines also the architectural, the gardenesque, and even in a slight degree the geometric, style. The entrance front of the house is at *a*, in the entrance court. There is a terrace-garden from *b* to *c*; and a walk commencing at *b*, proceeding by *e* and *d*, and returning to the terrace by *c*. The scenery from *c* to *d*, and also that near the water basins *w w*, is decidedly picturesque; that is, trees, shrubs, and flowers are grouped together in the same beds. On leaving the terrace at *b*, we pass between small trees, such as thorns, crabs, &c., placed at regular distances like an avenue, with circular flower-beds between;

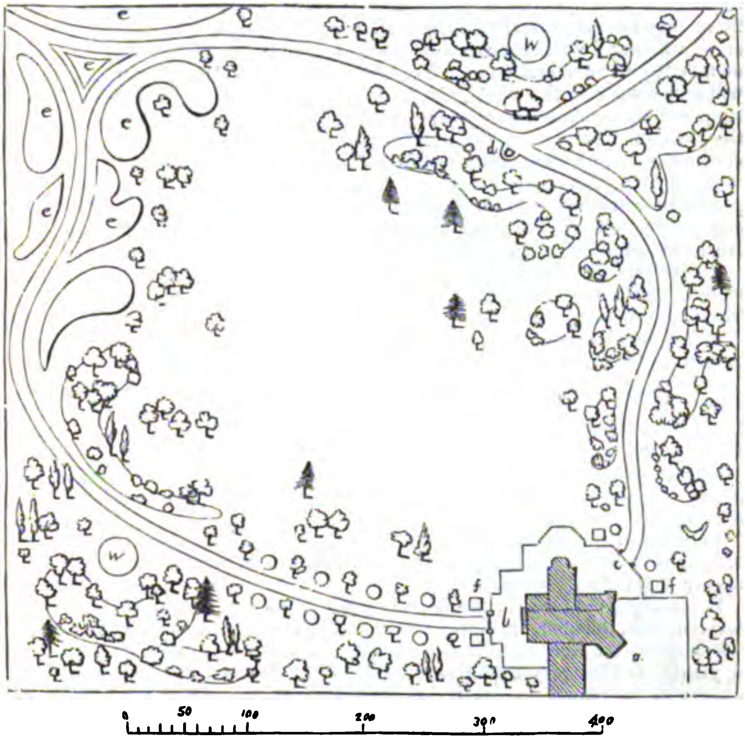


Fig. 48. *A Lawn laid out in the Picturesque Style, combining also the Gardenesque and the Regular Styles.*

and this part of the ground may be considered in the regular, or geometric, style. The circular beds of this style, and also one or two circular beds at *c*, are harmonised with the rectangular forms of the terrace by some square beds marked *f*. The beds *e e* are for roses and flowers, and may be considered as strictly gardenesque. At *d* is a statue, or a pedestal and vase, intended as an object when coming along the branch walk; so that we have in this sketch a harmonious combination of the picturesque, gardenesque, architectural, and geometric styles, in which, however, the picturesque style greatly prevails. While in the other design the object was chiefly to produce a display of flowers; in this one the object is to produce varied combinations of trees, shrubs, and plants, and shade and shelter, with masses of flowers as subordinate objects.

Fig. 49. is a lawn laid out in the geometric style, for shrubs and flowers, with few trees. In the centre are a circular basin and fountain; the margin of the basin is of stone, and outside of this is a circle of beds. The other beds require no description. A gravel walk surrounds the whole, beyond which there may be the formal boundary to the lawn required by the geometric style, whether a wall or other fence with a border for flowers and creepers, or a hedge architecturally cut. The circular beds are 6 ft. in diameter, which will give a scale to the whole, viz. 32 ft. to an inch. These circular beds are supposed to be planted solely with flowers, which will admit of views between the beds of shrubs from the walk across the lawn to the fountain, and also contrast well with the shrubs. All the other beds are supposed to be planted with shrubs, each kept a distinct bush, so that in this style we have the geometric combined with the gardenesque. In each of the terminating scrolls may be planted any fastigiate evergreen low tree or shrub, such as a cypress, Irish yew, or Irish or Swedish juniper.

By limiting the spaces planted to rhododendrons, azaleas, kalmias, andromedas, vacciniums, arbutus, &c., a very effective American shrubbery, or fruticetum, would be formed.

It may be observed that the boundary walk, which ought to be at least once and a half the width of the beds (viz. 9 ft.), is not bounded by straight lines, but by lines coinciding to a certain extent with the direction of the beds, which will take away from the trivial character which straight walks always have when accompanied by beds which do not coincide with them. It is necessary to keep this fact constantly in view when designing flower-gardens; because, unless this is done, there never can be that unity of the whole and connexion of the parts which are essential to the harmonious effect of every composition.

This design would also answer remarkably well for a rosary, or for a mixed collection of herbaceous plants, either annuals or perennials. It would also answer well for a dahlia garden.

By omitting the basin in the centre, and the borders which surround it, a covered seat, temple, or rustic bower might be placed there; or a weeping tree, such as the weeping lentiscus-leaved ash, or the weeping sophora, might be planted in the centre, and trained down over trelliswork. The giant ivy, planted in the centre, and treated in the same manner, forms a beautiful evergreen bower, and that in a very short time, if the soil is rich.

Fig. 50. (p. 173.) is a plan of an architectural flower-garden, the edgings to the beds being of stone, and the paths between paved. It was designed for a particular situation at Bitteswell in Leicestershire, but, in the execution, box edgings and gravel walks were substituted for stone. In order to show different ways in which this garden may be planted, we sent copies of the plan to Mr. Frost of Dropmore gardens, Mr. Caie of Bedford Lodge, Camden Hill, Mr. Pringle of Duncombe Park gardens, and Mr. W. P. Ayres of Acton, and we shall subjoin the lists supplied by each. We may previously observe that *a* represents a square basin, with a candelabrum fountain in the centre. It is supplied by a hydraulic ram, which forces the water to the upper tazza, from which it

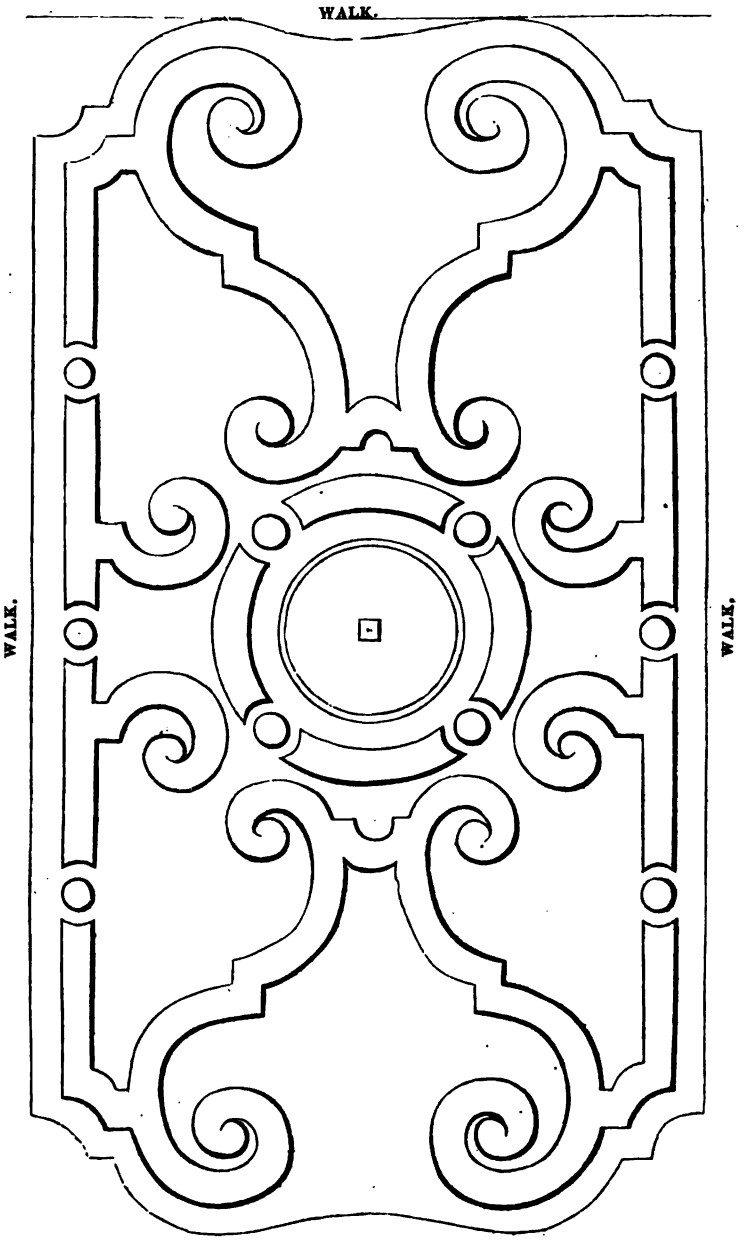


Fig. 49. *A Flower or Shrub Garden in the Geometric Style.*

descends by a succession of square tazzas of stone to the basin, which is bordered by a stone kerb.

b b are circles of grass to harmonise with the grass of the lawn beyond; in the centre of each circle there are a pedestal and statue.

c c are pedestals for vases, containing select flowers.

d d are square beds for standard roses, and mignonnette in summer; and winter aconite, crocuses, scillas, &c., during early spring.

List of Plants for the Flower-Garden fig. 50. By Mr. Frost.

As the beds are narrow (3 ft. wide), Mr. Frost observes, I have confined the list to rather weak-growing plants; if they had been 5 ft. wide, I should have added many things, such as petunias, salvias, &c., which would probably grow too large; though some persons, by care, might render these kinds suitable. I have chiefly included such things as we grow here, and what I know to be good. The small square beds not numbered will do well for standard roses and mignonnette; but I should have in them crocuses of sorts, *S*cílla præ'cox, *S.* amœ'na, Erythrònium Dens cànis (the three varieties), and snowdrops; also tulips in the beds allotted for planting afterwards with pelargoniums, or any of the other bulbs alternately, as it gives the garden a gay appearance early in the spring. The stock beds, 16, 26, &c., might be succeeded by later-sown stocks, or clarkias, collinsias, nemophilas, or any other hardy annuals: indeed, they might be sown in the autumn for the spring show as well as for that of summer, and used instead of tulips where tulips are not to be easily obtained. I have endeavoured to pair the beds, so that each corresponding bed should have plants of similar habits; and, should any one wish to deviate from the list laid down, they might readily substitute some favourite plant that might range for height and colour; such as the verbenas, for example, of which there might be better sorts selected than I have now specified, which can be arranged according to the same principle. — *Philip Frost. Dropmore Gardens, March* 7. 1843.

1. Nierembérg*ia* grácilis.
2. Lobèl*ia* *E*rìnus.
3. Nolàna *a*triplicifòlia.
4. Pelargònium, Cooper's dwarf scarlet.
5. Calceolària angustifòlia.
6. Fúchs*ia* Bréwster*i*.
7. White ten-week Stock.
8. Isótoma axillàris.
9. Lobèl*ia* spléndens.
10. *H*eliotròpium peruviànum.
11. Pelargònium Davey*ànum*.
12. *V*erbèna pícta.
13. *V*erbèna formòsa.
14. Lantàna Sello*viàna*.
15. Pelargònium, pink nosegay.
16. Purple German Stock.
17. *L*upìnus nànus.
18. Ferràr*ia* pavònia.
19. Alonsò*a* incisifòlia.
20. Tropæ'olum màjus flòre plèno.
21. Calceolària viscosíssima.
22. Pelargònium, Ingram's scarlet.
23. Lobèl*ia* unidentàta.
24. *O'*xalis tuberòsa.
25. Alonsò*a* lineàris.
26. Rose-coloured German Stock.
27. Calceolària Stewárt*ii*.
28. *G*ladìolus cardinàlis.
29. Pelargònium, cup-leaved pink.
30. Pelargònium compáctum.
31. *V*erbèna, Ivory's queen.
32. *V*erbèna máxima.
33. Pelargònium pavonìnum.
34. *S*enècio élegans flòre plèno.
35. Lobèl*ia* propínqua.
36. Pelargònium, Prince of Orange.
37. Scarlet ten-week Stock.
38. Fúchs*ia* globòsa.

List of Plants which will keep up a Show of Flowers in the Flower-Garden fig. 50. *till June.* By Mr. CAIE.

1. *A'*rabis præ'cox. White.
2. Eránthis hyemàlis. Yellow.
3. *S*cílla *h*yacinth*oìdes*. Blue.
4. *A*lýssum saxátile. Yellow.
5. *H*ésperis repánda. Purple.
6. *Tùlipa* Gesner*iàna*. Scarlet.

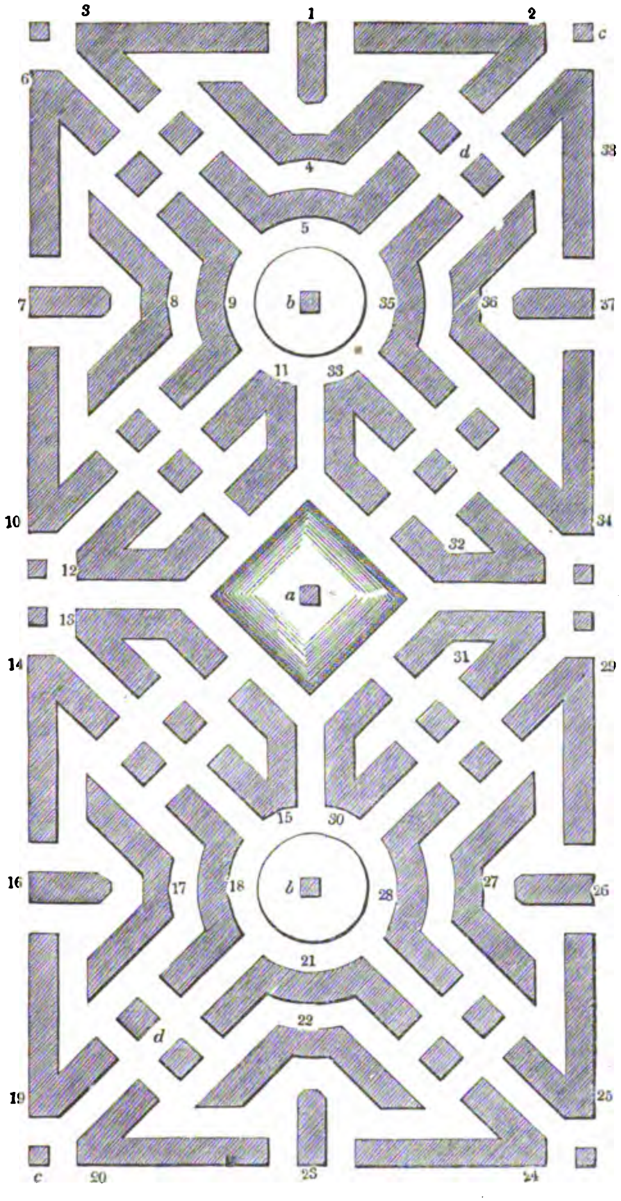


Fig. 50. *An Architectural Flower-Garden.*

7. Erythrònium Dens-cànis. Purple.
8. *I*bèris saxátilis. White.
9. *V*esicària utriculàta. Light yellow.
10. *P*olemònium réptans. Blue.
11. *L*ílium longiflòrum. White.
12. Adònis vernàlis. Yellow.
13. *P*hlóx vèrna. Pink.
14. *P*hlóx procúmbens. Lilac.
15. *N*arcíssus papyràceus. White.
16. *Tùlipa* præ'cox. Scarlet.
17. Fritillària meleàgris. Purple.
18. *N*arcíssus *Jonquílla*. Yellow.
19. Aubriè*tia* purpùrea. Purple.
20. *A*nemòne horténsis. Scarlet.
21. *S*cílla campanulàta. Dark purple.
22. Hepática tríloba rùbro-plèna. Double red.
23. Erythrònium Dens cànis albiflòra. White.
24. Hepática tríloba cær.-pl. Blue.
25. Cheiránthus ochroleùcus. Pale Yellow.
26. Sanguinària canadénsis. White.
27. Meconópsis cámbrica. Yellow.
28. *I*bèris sempervìrens. White.
29. *N*arcíssus mìnor. Yellow.
30. *C*orydàlis nóbilis. Yellow.
31. *F*lumària formòsa. Reddish.
32. *I*'ris vérna. Purple.
33. Cheiránthus *Cheìri*. Yellow.
34. *C*orydàlis bulbòsa. Purple.
35. Galánthus plicàtus. White.
36. *C*ròcus satìvus. Yellow.
37. *S*cílla præ'cox. Blue.
38. *P*hlóx ovàta. Pink.

List of Plants for the Flower-Garden fig. 50., *which will flower from June to September.* By Mr. Caie.

1. *Œ*nothèra macrocárpa. Yellow.
2. *V*erbèna spléndens. Dark crimson.
3. *S*álvia *c*hamædryoìdes. Blue.
4. *V*erbèna Thompson*iàna*. Whitish.
5. Frogmore Pelargonium. Scarlet.
6. Bouvárd*ia* coccínea. Scarlet.
7. *V*erbèna, the queen. White.
8. Calceolària angustifòlia. Yellow.
9. *V*erbèna *teucrioìdes*. Whitish pink.
10. *Petùnia* erubéscens. Whitish purple.
11. *V*erbèna Tweedie*àna*. Scarlet.
12. Calceolària rugòsa. Yellow.
13. Campánula carpática. Blue.
14. *V*erbèna Stewárt*ii*. Dark purple.
15. *V*erbèna Forstèr*ii*. Light crimson.
16. Tropæ'olum mìnus flòre plèno. Orange and yellow.
17. *Petùnia* triúmphans. Dark purple.
18. Calceolària integrifòlia. Yellow.
19. Bouvárd*ia* triphýlla. Scarlet.
20. *A*ntirrhìnum alpìnum. Light purple.
21. Pelargònium compáctum. Scarlet.
22. *Petùnia*, the Germ. Dark purple.
23. Alonsò*a* lineàris. Red.
24. *V*erbèna Hendersòn*ii*. Purple.
25. Campánula carpática. Blue.
26. *V*erbèna *Melin.* latifòlia. Scarlet.
27. Ivy-leaved Pelargonium. White.
28. *Œ*nothèra Drummónd*ii*, pegged down. Yellow.
29. Tourneförtia *h*eliotropioìdes. Pale lilac.
30. *V*erbèna *teucrioìdes*. White and pink.
31. *P*hlóx Drummónd*ii*. Purple.
32. Frogmore Pelargonium. Scarlet.
33. *V*erbèna amœ'na. Dark lilac.
34. *S*enècio élegans. Purple.
35. Calceolària angustifòlia. Yellow.
36. *V*erbèna, the queen. White.
37. *V*erbèna ígnea. Scarlet.
38. *V*erbèna Imri*àna*. Purple.

List of Plants for planting the Flower-Garden fig. 50. By Mr. Pringle.

Throughout the following arrangement, the plants mentioned first will be those for the first show of flowers. The low-growing plants or bulbs, called edgings, are to be planted in patches about 6 in. within the edgings of the beds; and in order to assist the amateur, or those who have not been in the habit of providing for flower-gardens, I have given the probable number of each plant that will be required, or at least the number that will be necessary to fill the bed; but, as the number required to stock a bed will often depend on the strength or weakness of the plants, sometimes two or three less or two or three more than I have mentioned may be required.

1. Bulbous Iris, 18 plants. Commelìn*a* tuberòsa, 27 plants.
2. Edging of Snowdrop, 30 patches. Standard Roses, 4 plants. German Asters.
3. Edging of Snowdrop, 30 patches. Standard Roses, 4 plants. German Asters.
4. Edging of Snowdrop, 30 patches. Mignonnette. Dahlias, 7 plants.
5. Edging of Snowdrop, 30 patches. Tulips, 200 roots. Scarlet Geraniums, 25 plants.
6. Edging of Yellow Crocus, 30 plants. Standard Roses, 4 plants. Chrysèi*s* cròcea.
7. Edging of Blue Hepatica, 14 plants. Carnations, 18 plants.
8. Edging of Heartsease, 26 plants. Dahlias, 7 plants.
9. Edging of Heartsease, 26 plants. Hyacinths Single, 200 roots. Shrubby Calceolarias, 25 plants.
10. Edging of Purple Auricula, 30 plants. Standard Roses, 4 plants. Dwarf Larkspur.
11. Edging of Purple Auricula, 30 plants. Double Anemones, 200 roots. Nierembérg*ia* lineàris, 25 plants.
12. 20 select Herbaceous Plants in two rows, with a patch of Narcissus between each plant, for an early bloom.
13. Narcissus between each plant, with patches of Fritillària meleàgris, &c.
14. Edging of Yellow Auricula, 30 plants. Standard Roses, 4 plants. Schizánthus venústus.
15. Edging of Yellow Auricula, 30 plants. Ranunculus, 200 roots. *A*nagállis Monélli, 25 plants.
16. Edging of Red Hepatica, 14 plants. Picotees, 18 plants.
17. Edging of Heartsease, 26 plants. Dahlias, 7 plants
18. Edging of Heartsease, 26 plants. Jonquils, 200 roots. Lobèl*ia* propínqua, 25 plants.
19. Edging of Blue Crocus, 30 roots. Standard Roses, 4 plants. Callióp-sis bícolor.
20. Edging of Snowdrop, 30 roots. Standard Roses, 4 plants. German Stocks.
21. Edging of Snowdrop, 30 roots. Double Tulips, 200 roots. *S*álvia pàtens, 25 plants.
22. Edging of Snowdrop, 30 roots. Mignonnette. Dahlias, 7 plants
23. Edging of Snowdrop, 30 roots. Bulbous Iris, 18 roots. Tigrídia pavònia, 27 plants.
24. Edging of Snowdrop, 30 roots. Standard Roses, 4 plants. German Stocks.
25. Edging of Striped Crocus, 30 roots. Standard Roses, 4 plants. French Marigold.
26. Erythrònium Dens cànis, 14 roots. Pinks, 30 plants.
27. Polyanthus, 26 plants. Dahlias, 7 plants.
28. Van Thol Tulips, 200 roots. *S*álvia fúlgens, 25 plants.
29. Hepatica, 30 plants. Standard Roses, 4 plants. Godètia rubicúnda.
30. Turban Ranunculus, 200 roots. *H*eliotròpium peruviànum, 25 plants.
31. 20 select Herbaceous Plants, in two rows, with a patch of Martagon Lily between each two Herbaceous Plants.
32. 20 select Herbaceous Plants in two rows, with patches of *G*ladìolus commùnis, or any other hardy species.
33. Single Anemones, 200 roots. Nierembérg*ia* lineàris, 30 plants.
34. Hepatica, 30 plants. Standard Roses, 4 plants. Brachýcome iberidifòlia.
35. Double Hyacinths, 200 roots. *Petùnia* phœnícea, 25 plants.
36. Double Primrose, 26 plants. Dahlias, 7 plants.
37. *S*cílla bifòlia, 14 patches. Pinks, 30 plants.
38. Striped Crocus, 30 patches. Standard Roses, 4 plants. African Marigold.

a, Basin of Water, with an enriched sculptured vase in the centre, with jet d'eau, or other contrivances that the proprictor may choose, according to the head and supply of water that he has at command.
b b, Figures, or Groups of Figures, emblematical of the beauties or riches of the vegetable kingdom.
c c, Vases, elevated on pedestals proportionate to the size of the vase, and filled with handsome specimens of plants in flower, to be changed when required during summer.
d d, Beds of choice varieties of Fuchsias, or of choice Pelargoniums.

An Arrangement of Plants for the Flower-Garden fig. 50., *by which, when the Beds are once stocked, they will require very little annual Preparation to keep up the Stock of Plants; and which may be suitable for some Gardens where there is not the Convenience of much Glass, and where it is desirable that the Whole should be kept up at comparatively little annual Expense of Labour.* By Mr. Pringle.

1. *E*rìca herbàcea. Kalmia of species.
2. Snowdrops. Early flowering Annuals. Dahlias.
3. Snowdrops. Early flowering Annuals. Dahlias.
4. Narcissus. Fuchsias.
5. Eránthis hyemàlis. Common China Roses, trained on a flat trellis.
6. Yellow Crocus. *D*elphínium of Species.
7. Gaulthèr*ia Shállon*. Yellow Azaleas.
8. Fritillària. Fuchsias.
9. Grape Hyacinth. Noisette Roses, on a flat trellis.
10. Auriculas. Herbaceous Plants mixed.
11. Polyanthus. Provence Roses, Dwarf.
12. American Plants mixed.
13. American Plants mixed.
14. Auriculas. Herbaceous Plants mixed.
15. Prímula farinòsa. Scotch Roses, Dwarf.
16. Gaulthèr*ia* procúmbens. Azaleas, Red.
17. *G*enti*àna* acaúlis. Scarlet Geraniums.
18. Erythrònium Dens cànis. Bourbon Roses, on a flat trellis.
19. Crocus, Blue. Potentillas of different species.
20. Snowdrop. Early Annuals. Dahlias.
21. Adòni*s* vernàlis. Tea-scented Roses, on a flat trellis.
22. Orange Lily. *S*álvia pàtens.
23. Andromedas of different species.
24. Snowdrops. Early Annuals. Dahlias.
25. Striped Crocus. Phlox of species.
26. Vacciniums of species.
27. *Pulsatílla* vérna. Petunias.
28. *S*cílla bifòlia. Hybrid China Roses, on a flat trellis.
29. Hepatica. Herbaceous Plants mixed.
30. Prímula cortuso*ìdes*. Perpetual Roses, Dwarf.
31. Rhododendrons of different species.
32. Rhododendrons, Hybrids.
33. Alpine Auricula. Moss Roses.
34. Hepatica. Herbaceous Plants mixed.
35. *H*yacínthu*s* monstròsus. Macartney Roses, on a flat trellis.
36. Gladiolus. Fuchsias.
37. Vacciniums of different species.
38. Striped Crocus. Pentstemon of different species.

a a, *b b*, *c c*, as in the preceding arrangement.
d d, Rose Pillars; or Roses trained on an umbrella or other fancy trellis.

Remarks. By each of the above arrangements a good bloom may be obtained during the flowering season; and out of the two a third might be arranged. Thus, by taking the beds, 2. 3. 6. 10. 14. 19. 20. 24. 25. 29. 34. and 38. of the first arrangement, and joining them to the second, the garden would then be a rosary; by which, with a proper selection of successional kinds, with the bulbs and other plants used as edging to the beds, a regular supply of flowers might be obtained.—*J. P.*

(*To be continued.*)

ART. IV. *Notice of a heating Apparatus in the Gardens of His Grace the Duke of Wellington at Strathfieldsaye.* By JOHN JOHNSON, Gardener there.

THE apparatus (*fig.* 51.) consists of a stove (originally Dr. Arnott's) and two copper cylinders. The stove contains two copper boilers 1 ft. deep and 3 in. wide, which form the fire-box of the stove, out of which the boiling water flows by the top pipe into the cylinder, and returns by the lower pipe into the bottom of the boiler. The cylinders have each thirty tubes, 1 in. in diameter, extending through the whole length (amongst which the water flows), giving out an extent of heated surface equal to the outside of the cylinder, and through which the air circulates. The dimensions are, stove 1 ft. 6 in. square, and 3 ft. 9 in. in height, including the ornamental cap on the top, which is 4 in. deep; cylinders 1 ft. 6 in. in diameter, and the same height as the stove, including the caps.

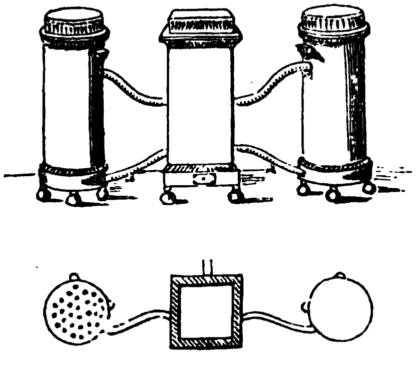


Fig. 51. *Heating Apparatus at Strathfieldsaye.*

It consumes exactly one bushel of coke per day, the half of which is supplied every morning and evening. The water is supplied by a covered valve near the top of the cylinder, as seen in the figure. There is a small pipe for evaporation at the back part of the cylinder. The ornamental caps are movable, and conceal the tubes of the cylinders and the feed-hole of the stove. The smoke escapes by a tube at the back of the stove, communicating with a flue built in the wall.

There are two of the above apparatuses in the conservatory at this place, which is 67 ft. long, 27 ft. wide, and 21 ft. high, and which for the last four years has been sufficiently heated to preserve the plants from injury from cold or damp.

Strathfieldsaye, Feb. 11. 1843.

Art. V. *On making Garden Besoms.* By A. F.

Seeing nothing, in any of your numerous works on gardening and rural economy, on the manufacture of an article the most essential to, and most generally used in, every well-kept garden, I have taken some pains to point out to you, and, through your Magazine, to my friends in the wide field of gardening, the manly use of besoms, and a very superior mode of manufacturing them. It is nothing of my own, nor is it, perhaps, new to some of your readers; but certainly it is not known or practised by one in a hundred that have the greatest occasion to do so.

I need not tell you, or any other gentleman or gardener at all acquainted with rural affairs in this country, that besoms are made of birch, heather, or any other tough spray that can be most readily come at; but I must tell you that, when the birch is got in lengths of 3 ft. from the top, it is to be singled by tearing the strong forked branches asunder with the hands without any tool, and when this is done the besom-builders begin, two to form the faggot, and one to bind; and, by the following contrivance, six score may be bound in an hour by one man.

A rope, of the strength and suppleness of window sash-cord, is to be attached to a beam in the roof of a shed, as in *fig.* 52., and it must be long enough to let one end reach the floor; this end is to be in a double of the cord for a man to put his foot into, like a stirrup. The faggot of birch, straight and the right size for the besom, is handed to this man, who puts his cord once round the birch, and, setting his foot in the stirrup, tightens the faggot in the place where the first tie from the tip is to be, and keeps it tight till he puts a tarred string twice round and ties it; then, shifting his cord to the place where the other tie is wanted, tightens and ties that in like manner; with such a thorough command of, and such an ability easily to compress, these otherwise unyielding materials, as cannot fail to please the workmen and profit the employer, who thus gets a day's tying done in an hour; and, instead of making this trade an excuse for idling away wet days, the gardener may get a waggon-load of birch worked into besoms in the course of a day, by half a dozen handy labourers.

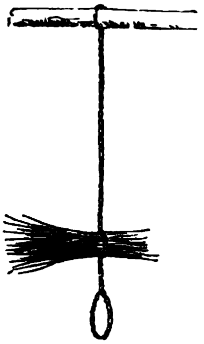


Fig. 52. *Contrivance for binding Birch Besoms.*

Now for the wielding of the instrument after it is made; and we shall take, as an example, the cleaning of a lawn after a morning's mowing. Every alternate swarth is to be raked with a common hay-rake, or other blunt-toothed rake, in such a way as to leave a breadth of two swarths for the long-handled besom. Along the centre of this cleared space, a man starts with a flattened besom on the end of a nine-foot handle, and sends all the grass that he meets with right and left, leaving these two swarths cleanly swept. A boy or a woman, with a short-handled besom, follows after, and sweeps ten yards of this ridge upward, and ten yards downward, thus leaving the lawn studded with heaps of grass 60 ft. apart one way, and 15 or 18 feet apart the other way. This is again basketed into the grass-cart by a man and a boy with a couple of boards and a besom. When this plan is followed all is regularity; the long-handled besom, doing the bulk of the brushing without ever having to touch a blade of grass twice over, is a manly straight-forward sweeper; for the person stands upright as a dart, and moves forward in a line, swinging his arms on even balance, furrowing the greensward, whilst the women and boys with their four-foot besoms lay it in heaps.

The handles of the besoms should be shod with iron in the form of an arrow head, and have a ferrule on the other end, to prevent the wood from giving way in the act of putting the heads of birch on the besom's tail; and, when done in this manner, the same handle will last a life-time, and be softer and smoother for the hand than the rustic cudgels that besom-makers tail their faggots with, and sell to cockneys for garden brooms.

Staffordshire, March, 1843.

ART. VI. *The Squirrel.* By CHARLES WATERTON, Esq.

HORTICULTURE and zoology are contiguous provinces. Surely, then, no one in these days of liberality can find fault with Mr. Wighton for straying a little out of bounds. Let him not fear the apparition of a birch rod.

If squirrels injure the shoots of my spruce firs, which they are known to frequent, trivial indeed must be the damage, and quick the reparation by old Dame Nature, for the trees bear no marks of aggression.

Had the squirrel been wild, in the wild woods, at the time that Mr. Wighton saw it eat the birds, I should not hesitate to pronounce that individual squirrel to be carnivorous, because I believe that Mr. Wighton would only state what he conceived to be "correct." Still, we must allow that there are exceptions to all rules. Don Quixote put Sancho Panza in mind that summer did not always set in with the appearance of the first swallow. Sir William Jardine shot a barn owl in the very act of hooting. Probably, neither the baronet, nor any body else, will ever perform a similar feat, for barn owls do not hoot.

I gather from Mr. Wighton's communication of January 3. [p. 117.], that his squirrel was *in captivity* when it partook of a carnal repast. This single fact at once precludes the possibility of the squirrel family being raised to the rank of carnivorous animals. The incarceration only of "a few days" might have injured the prisoner seriously, either in his nervous system, or in his gastric powers, or in his olfactory sensibilities. Now, a sudden derangement in all, or even in any one, of these component parts of a squirrel's frame, might have affected his health sufficiently to have induced him to try a change of larder; and, should this have been the case, I don't know a nicer morsel for the alterative system than a tender and a well-fed swallow. Under existing circumstances (loss of liberty, to wit), I am not at all astonished that Mr. Wighton's squirrel should dine on bird, raw or roasted we are not informed; even though the said squirrel were well supplied, on the same table, "with his favourite kind of food."

I wish we knew more than we do of the carnivorous propensities, or the want of them, in certain animals. We might then be able to account tolerably well for many strange occurrences, which every now and then puzzle us so much, in the workings of zoological gastronomy. So unaccountable, indeed, are sometimes the actions both of man and beast, not only in the eating department, but also in domestic arrangements, that we might really fancy the performers not to be quite right in their heads.

Whilst I am actually writing this, there are two geese on the lawn before me. One of them is a Canada goose, the other a barnacle gander. The latter is about half the size of the former. Notwithstanding this disparity, the old fool of a goose has taken the insignificant little fellow into connubial favour, although there are four and twenty others of the Canada species here, from which she has it fully in her power to make a more profitable choice. Singular to tell, this is the third year that these infatuated simpletons have paired, and the goose laid eggs, without any chance of a progeny. And, in high quarters, sometimes unions take place, where the husband is ignorant of the language of his wife, and the wife of that of her husband.

How capricious, then, is the taste, not only of Mr. Wighton's captive squirrels, but also of geese, and eke of man himself! By only "a few days'" loss of liberty, I have shown that Mr. Wighton's pretty squirrel preferred the flesh of birds to its own "favourite kind of food."

My tom-cat, apparently an excellent mouser, will sometimes eat plentifully of dry biscuit, and turn up his nose at mutton chop. Sterne's ass seemed to relish macaroon. Did all asses relish macaroon, we might doubt the fitness of the Spanish proverb, "La miel no es para la boca del asno:" Honey is not made for the mouth of the ass. Parrots in cages will pull off their own feathers, and eat them by the dozen. Blackbirds, although on very short allowance, caused by the frosty weather, would not touch their favourite ivy berries, which were thrown down in abundance for them in the garden of my friend, Mr. Loudon of Bayswater. I knew a healthy old owl who took her confinement so much to heart that she refused all kind of food, and died at last for want of it. And, when I was in the Mediterranean Sea, I saw a brute in the shape of man, swallow pieces of raw fowl (which he had torn asunder, feathers and all,) with as much avidity as Sir Robert Peel devours our incomes.

Should Mr. Wighton read this paper, he cannot fail to perceive that I have many serious obstacles to overcome, before I can arrive at the very important conclusion, that the family of squirrel is carnivorous in its own native haunts.

Walton Hall, March 8. 1843.

Art. VII. *Arboricultural Notices.*

Disbarking Timber Trees to increase the Durability of the Timber is useful in the case of the resinous tribe, but injurious with trees that are non-resinous. This is the result of extensive experience in the South of France by M. Laure of Toulon. This gentleman has also found that the trunk of the white oak (Quércus pedunculàta), disbarked when in full sap, has a power of reproducing the bark. Soon after disbarking, some drops of a fluid ooze out, which thickens and takes a green colour as soon as it comes in contact with the atmosphere; and this process of oozing out, thickening, and colouring, continues till the surface of the trunk, which had previously been laid bare as far as the soft wood, is covered with a rough granulated surface of a greyish colour without, and of a herbaceous green within. By degrees, a very thin pellicle is formed on the surface of this exuded matter, which ends in becoming the epidermis of a new bark; and this bark, by the end of the first summer, becomes of sufficient thickness to admit of the descent of the sap from the branches to the base of the trunk. (*Ann. d'Hort. Soc. de Paris*, tom. xxxi. p. 17.) [We have known the same thing take place in the case of a pear tree, the trunk of which had been laid completely bare to the white wood all round, and for between 3 ft. and 4 ft. in length.]

Raising American Trees from Seed.—Mr. Charlwood's annual *Catalogue of American Tree Seeds*, just printed, is this year unusually rich in the genera Andrómeda, Júglans, Càrya, Magnòlia, Pìnus, Rhododéndron, and various others; and, as packets of these seeds may be sent by post to any part of the United Kingdom, there never was so fine an opportunity for provincial nurserymen and country gentlemen to enlarge their arboretums at little expense. We would recommend first procuring a catalogue from Mr. Charlwood, and next marking the species wanted, and returning it with an order at the rate of 1*s*. for every species marked. We mention this mode, because a gentleman with whom we have been conversing on the subject has complained to us that some of the kinds are sold only by the bushel, and that he only wants a few plants to extend his collection. — *Cond.*

Nuts with a bony Shell, such as those of the olive, holly, hawthorn, &c., which at present lie a year in the ground before they germinate, have been found to grow the first year when the nut is broken, provided the kernel is not injured. This has been effected in France, in the case of the olive, by the aid of a small press or a vice, with which, it is said, a female can break 2000 olive nuts in one day, without injuring the kernels. We doubt if this could be done so easily with the nuts of the holly or the hawthorn, but the suggestion is worth trying. (*Annales d'Hort. de Paris*, tom. xxxi. p. 15.)

Paulòwnia imperiàlis, in the Jardin des Plantes, showed flower-buds in the autumn of 1841, which stood the winter and came into flower on the 29th of April, 1842; thus proving the great hardiness of the tree when it can ripen its wood. The flowers are of a fine blue, somewhat like those of Gloxínia cauléscens, and they have an agreeable smell like those of Philadélphus. The Paulòwnia has been propagated to an amazing extent in France, so much so, that it is said already to have produced more money to commercial gardeners than any other plant known. The price has fallen from 5 guineas to 2*s*. 6*d*. (*Annales d'Hort. de Paris*, tom. xxx. p. 406.)

Balsam Poplars.—The following kinds are described by Dr. Fischer of St. Petersburg in the *Garten Zeitung*, vol. ix. p. 401., and also in the *Botanical Register* for March, 1843. We trust some nurseryman or private gentleman connected with St. Petersburg will endeavour to procure living plants of such of them as are not already in this country, or rather of the whole of them; for, though there are several of the names in Messrs. Loddiges's collection, yet the plants are too small to enable us to judge how far they answer Dr. Fischer's description. Should this meet the eye of Dr. Fischer, or of any one else who possesses the whole collection, we beg to state that we shall feel greatly obliged by a plant or a cutting of each, for which we shall be glad to reciprocate.

Pópulus balsamífera *L.*, *P.* trístis *Fisch.*, *P.* longifòlia *Fisch.*, *P.* cándicans *Hort. Kew.*, *P.* pseùdo-balsamífera *Fisch.*, *P.* laurifòlia *Ledebour*, *P.* suaveòlens *Fisch.*

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

A NARRATIVE of a Visit to the Australian Colonies. By James Backhouse. Illustrated by three maps, fifteen etchings, and several wood-cuts. 8vo, pp. 704. London and York, 1843.

Some of our readers may recollect an article on the indigenous esculents of Van Diemen's Land, in our Volume for 1835 p. 338., by the author of the *Narrative* now before us. Mr. Backhouse was at that time in Australia, on a visit which occupied nearly six years, terminating with 1838. "It was undertaken, solely, for the purpose of discharging a religious duty. During its course, the writer kept a Journal, in which, having been trained to habits of observation, records were made, not only on religious subjects, but also on such as regarded the productions of the countries visited, the state of the aborigines, and the emigrant and prisoner population, &c."

The work consists of 47 chapters, and 18 papers as an appendix, and it is illustrated by many very clever etchings, independently of large maps, and several wood-cuts. Every chapter is a personal relation of what took place with the author and his fellow-traveller, and recounts not only what relates to his "religious duty," but what he observed as a naturalist, and more especially as a botanist. The two pursuits appear to have gone hand in hand, in the most natural manner; and it is impossible not to be deeply affected by the sincere piety of the author on the one hand, and on the other instructed by his observations on the animals, plants, and geological features, that fell in his way. Add to this the many incidents which befell him in a country under the peculiar circumstances of almost the only inhabitants being either aboriginal savages or convicts. In a word, Mr. Backhouse's *Narrative* is a singularly entertaining book, as much so as *The Bible in Spain;* but, though equally religious, yet quite in a different way.

In the appendix is an enlarged version of the paper already referred to, by which it appears that there is not a single plant indigenous to Australia worth cultivating for its fruit, or as a culinary vegetable, unless it be the common mushroom. Most of the European fruits and vegetables, however, thrive well. It will readily be conceived that in such a climate as Australia a green lawn cannot readily be obtained in the summer season; nevertheless we have a substitute for perpetual verdant herbage in a stemless evergreen Xanthorrhœ'a, or grass tree, which reminds us of a plant recommended by Duhamel for a similar purpose in the warmer parts of France, the ephedra (*E. of Trees and Shrubs*, p. 937.); while for dry sandy soils, both in France and England, M. Vilmorin recommends (Vol. for 1841, p. 199.) the *Brómus* praténsis.

We could extract many singular facts and entertaining passages from this work, but we prefer recommending the original. We intend, however, to return to it, and select a list of the plants mentioned, bringing together their habitats and such other particulars as lie scattered over the volume. We could wish, indeed, that this had been done by Mr. Backhouse himself, either in an appendix or in a botanical index.

Treatise on the cultivated Grasses and other Herbage and Forage Plants, with the Kinds and Quantities of Seeds for sowing down Land to alternate Husbandry, permanent Pasture, Lawns, &c. By Peter Lawson and Son, Seedsmen to the Highland and Agricultural Society of Scotland. Pamph. 8vo, pp. 49. Edinburgh and London, 1843.

This is a very carefully prepared work, and one which ought to be in the hands of every farmer who practises the alternate husbandry, and of every gardener who has lawns to form. The introduction contains the history of herbage and forage plants, in the early ages, in England, in Scotland, and in Ireland; and a history of the introduction of species and of varieties. Next follow descriptions of the true or natural grasses, and of the clovers or artificial grasses, followed by remarks on sowing by measure and weight, and a table of weights per bushel, and number of seeds per ounce. Then follow 13 tables of kinds and quantities of grass seeds required for sowing an imperial acre; 1. for alternate husbandry; 2. for permanent pasture, first mixture and second mixture; 3. for permanent lawn pastures, first mixture and second mixture; 4. for fine lawns, bowling-greens, &c.; 5. for lands in preparation for irrigation; 6. for pasture and hay in orchards, &c.; 7. for pasturage and cover in thick shady woods; 8. for heathy and moory lands, &c.; 9. for improved dry mossy grounds, &c.; 10. for marshy grounds, &c.; 11. for warrens and light sandy links; 12. for dry gravelly situations, &c.; and 13. for drifting or blowing sands. The following quotations will afford a specimen of the valuable matter contained in this pamphlet.

"*Weight of Seeds preferable to Measure.*—It was formerly an almost universal practice to sow the grasses by *measure*, and the clovers by *weight*; but, of late, the more judicious innovation of sowing *the whole by weight* has been successfully introduced; for although the greater weight in one sort is no criterion of its superiority over less weight in another, yet a greater weight in the same kind always denotes a superior quality. Thus, when seed is light, and consequently inferior, the greatest number of seeds is obtained by adhering to a given weight; and hence there is a chance of nearly an equal number of plants springing up as when the seeds are plump and heavy. But a given weight or measure, applied to the seeds of different grasses, is no indication of the number of plants each sort will produce; there being material differences both in the relative bulk and specific gravities of such seeds, as well as a difference in the number of each which germinate in a given quantity. In making out the tables, these variations have therefore been kept in view; and it has also been deemed useful, for the purposes of comparison, to subjoin a tabular statement of the average weight per bushel of each of the kinds of seeds recommended, with the average number of seeds required to weigh one ounce." (p. 33.)

In this table, the greatest number of seeds contained in an ounce is in the case of *A*gróstis stolonífera, the marsh creeping bent-grass, or fiorin, amounting to 500,000; and the smallest number is in *E*'lymus geniculàtus, the jointed sand lyme grass, an ounce of the seeds of which contains only 2300 seeds. With regard to weight, a bushel of Cynosùrus cristàtus, the crested dog's-tail grass, weighs 26 lb.; while a bushel of *A*vèna flavéscens, the yellowish oat grass, weighs only 5 lb. In the case of the herbage plants not grasses, an ounce of *A*chillèa *M*illefòlium, the yarrow or common milfoil, an ounce contains 200,000 seeds, and a bushel weighs 29¼ lb. while an ounce of common red clover contains 16,000 seeds, and a bushel weighs 64 lb. As might be expected, the variation in the weight per bushel of the seeds of the dicotyledonous herbage plants is not nearly so great as in the case of the proper grasses.

"*Sowing with and without a Crop.*—It is not our purpose here to discuss the question, as to whether it is better to sow grass seeds for permanent pasture with or without a corn crop. Both systems have their advocates, as well as their advantages and defects, and depend, in a great measure, on the varied circumstances which present themselves in practice; and therefore, in the following tables, separate columns are given for each of these methods; it being always expedient to sow a somewhat larger portion of seeds without than with a corn crop; and, in that case, it is farther advisable, for affording shelter to the young plants, to add a bushel of rye to the mixture when sown in autumn, and a bushel of barley when sown in spring; to be depastured or cut green along with the young grass crop." (p. 34.)

As a specimen of the care with which the tables have been drawn up, we give an extract from IV., which exhibits the mixture for "Fine Lawns, Bowling-Greens, &c., kept constantly under the scythe." There are three columns, viz. for light soils, heavy soils, and medium soils, and in each column there is the quantity for sowing with a crop and without a crop. We shall give a selection for a medium soil without a crop, viz. Cynosùrus cristàtus, 6 lb.; *Festùca* duriúscula, 3 lb.; *Festùca* tenuifòlia, 2 lb.; *L*òlium perénne ténue, 20 lb.; *P*òa nemoràlis, 1¾ lb.; *P*. n. sempervìrens, 1¾ lb.; *P*òa triviàlis, 1¾ lb.; *T*rifòlium rèpens, 7 lb.; and *T*. r. mìnus, 2 lb.; in all 45¼ lb. to a statute acre.

"In walks, bowling-greens, &c., which are wished to be kept as dry as possible, especially towards the end of the season, *T*rifòlium rèpens should be sparingly introduced; and when it is intended to mow the grass by machine, instead of the common scythe, greater proportions of the hard and fine-leaved fescues may be sown." (p. 40.)

The prices of all the seeds enumerated in the tables may be ascertained by application to the authors for their priced list of agricultural seeds, which they publish annually.

Art. II. *Literary Notices.*

Remarks on the Laying out of Cemeteries and the Improvement of Churchyards, forming an octavo pamphlet of 130 pages, with above 50 engravings, will appear with the present Number. It contains the two articles already published, and those which are intended to appear; therefore no reader of this Magazine need have recourse to the pamphlet.

London Nuisances; viz. Smoke, Water, Fire, Sewerage, Roads, &c., will appear on April 1., and will be completed in 12 numbers. The author is A. Booth, Esq., chemical engineer, whose *Guide to London* is noticed in our Volume for 1839, p. 562.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

To prevent Mice from destroying early sown Peas, take a few small slices of bread, and dust a little arsenic on them. Place these slices on different parts where the peas are sown, and cover them over with pots or any other thing, so that nothing but the mice can get to the bread. This plan I have found quite sure of destroying the mice.—*M. Saul.*

Dámmara *orientàlis* has been found by M. Neumann to succeed when grafted on the Araucària imbricàta. The mode adopted is the wedge side-grafting, invented by Mr. Barron in grafting the deodara on the cedar of Lebanon, and described in our Volume for 1838, p. 80. One advantage of this mode of grafting (by which the stock is not cut over) is, that, if it does not succeed, the stock is not injured; but with M. Neumann there was hardly a single failure. *Dámmara* austràlis might probably be rendered half-hardy by being grafted on the Araucària. (*Ann. d'Hort. de Paris*, tom. xxx. p. 393.)

Art. II. *Retrospective Criticism.*

Cemeteries.—I have perused your paper on cemeteries with very great interest indeed. I clearly see how constant and deep has been your research in this department. But I could wish (pardon me) that your pen had here and there been guided by a Catholic hand. There are no midnight masses, except on one single night in the year; and that mass is celebrated at Christmas. Père de la Chaise was one of the best of men, and did not deserve the abuse which the Calvinists heaped upon him. I have taken a good deal of notice of cemeteries, both here and abroad; but I should never think of handling the subject, because my remarks would not suit a Protestant eye. Till the Reformation, a universal belief in purgatory existed; that is, a place of punishment hereafter (not endless) for the expiation of *venial* sins committed in this life, since nothing impure can enter heaven. The Reformers, solely on their own authority, thought fit to teach otherwise; and this new doctrine of theirs quite changed the face of the churchyard, and rendered it a dreary waste. Far different was the appearance of our English churchyards in Catholic times. The cross over the grave was a noble and a consoling sign. It at once put the visiting friends of the departed in mind of what their Saviour had suffered for man's redemption; and, before they went away, they would kneel down and say the prayer "De profundis" for the soul of him or of her whose remains lay there. Indeed, there is something so cold and forbidding, and dreary and desolate, in the reformed churchyards, that, when I am obliged to pass through them, I could fancy that Christianity had left the land. In Catholic countries, there is something exquisitely soothing to the mind when one sees the living bowed down in humble and fervent prayer before the cross at the head of the grave, to beg our dear Redeemer to take to eternal glory the soul of one who now can no longer help himself.—*Charles Waterton. Walton Hall, March* 8. 1843.

Use of Charcoal in the Culture of Plants.—The following is the extract from the 2d volume of the *Biblioteca Agraria* of Professor Joseph Moretti and Carlo Chiolini, respecting wood charcoal, which I mentioned in my letter of the 7th of December. [p. 140.]

"From numerous experiments made by the Abbé G. Piccone, this substance [charcoal] is considered as an efficacious manure. It consists principally of oxide of carbon, the primary element of vegetable productions, and is, therefore, undoubtedly calculated to be employed for the purpose specified. According to the above author, every sort of charcoal, whether of oak, chestnut, or of any other sort of wood, the refuse of the charcoal, the small particles, or still better the dust, can be used as manure for every species of plant and in every soil. The charcoal of close-grained wood, therefore, should be the richer in nutritious particles, as it contains less ashes and earth. The effect is more speedy and vigorous according to the fineness of the pulverisation of the charcoal; if it is coarse the effect is weaker but more durable. When the charcoal is intended to manure a field for several years, or the roots of vines and fruit trees, it is not necessary to pulverise it very fine. It is sufficient in such cases to triturate it so that the largest pieces may not exceed the size of a vetch. The means used for triturating the charcoal are, the olive presses, mallets, and large pestles of iron or heavy wood, suspended from a beam of wood like that of turners' and many other machines. The dust which is produced during trituration is easily laid by sprinkling it with water. When the pulverised charcoal is to be used in flower-pots, in furrows, in seed pans, or in seed beds, it is sprinkled on the surface and incorporated with the spade or with the watering-pot. This may also be done after the plants have germinated, and are 2 or 3 inches high, according to the nature of the species. In sown fields the same method is followed in applying it as with manure. Therefore, in treating ground burnt up by the sun, according to the opinion of the Abbé Piccone, it is laid on the ground towards spring, when French beans are to be sown, to preserve them from drought; to these succeed common beans, and afterwards wheat or any other grain without manure. In soils less arid, the rotation is begun with potatoes, hemp, buckwheat, and wheat. In every case the seed should be used sparingly. On artificial meadows charcoal dust is sprinkled in spring on the surface, as is practised with chalk and lands containing saltpetre. As to the quantity, the Abbé Piccone computes about an equal weight between charcoal and woollen rags, skins, and even scrapings of bones: a rubbo (about 18 lb. avoirdupois) of charcoal to two of new urine; three of night-soil well digested; four of fresh, and six of common, manure. After this, he advises, for olive grounds, vineyards, orange gardens, or orchards, to allow an interval of four years for the first time, five for the second, and six for the third, and so on between every manuring, taking care always to increase the quantity according to the growth of the trees." And since we are in the way, allow me to compare some articles in the *Gardener's Magazine* with some in the Latin authors *de re rusticâ*, on the preservation of fruit, &c.

Preservation of Grapes. In the *Gardener's Magazine* for 1841, p. 646., the author says, " and (I) cut the whole of the grapes remaining, with a joint or two or more of wood below the bunch. I make a clean cut, and apply sealing-wax, as hot as can be used, to it, and seal the wood closely, so that no air can enter in the tissues communicating with the bunch. I then hang the bunches upon cords suspended across a closet in a cool airy room, taking care that they do not touch each other; and, after this, they are cut down as wanted. To succeed, much depends on the situation where the grapes are preserved; they must not be exposed to a current of warm air, nor yet be so damp as to cause mould. The bunches being well sealed is a most important point to be attended to."

Varro, in chap. lviii. *De Re rusticâ*, in answer to Cato, says, " Cato ait, uvam Aminneam miniusculam et majorem, et Apiciam, in ollis commodissime condes:" and Cato, in chap. vii. *De Re rusticâ*, " Hæc," that is, the grapes, " in ollis, ollæ in vinariis, conduntur; eadem in sapa, in musto, in lora recte conduntur." Thus far little or nothing can be understood; but let us hear Columella, who describes the process at length in chap. xliii. " As soon as you have cut the bunches of grapes, either those with large berries, or hard or purple berries, pitch over the footstalks immediately with hard pitch; then fill a new jar of burnt clay (new, because it should have no smell) with well dried straw free from dust, and spread the bunches on the straw; then cover this with another vase, and smear them all round with clay very thick and mixed with small pieces of straw; and in this state the jars are put on a dry floor, where they are surrounded with straw. Every sort of grape may be preserved, provided they are gathered in the waning moon, after it is set, in a clear sky, after the fourth hour of the day, when the sun has dried up the dew. But the fire should be lighted as near as possible to boil the pitch in which the stalks of the grapes are to be dipped."

Now I ask, what difference is there in the application and effect, between the *sealing-wax* of G. G. and the *dura pix* of the *rustici Latini?* To succeed well, the English author observes that the bunches should neither be exposed to currents of warm air nor to damp; and this is what Columella effectually provides against by placing his grapes in burnt earthen jars on clean and dry straw, and covering them hermetically with other jars, which he besmears with clay.

The uncle of Columella, however, made use of another method. " Marcus Columella, my uncle, ordered long jars, like dishes, to be made of the clay of which amphoræ are made, and desired them to be coated, outside and in, with a good coat of pitch. This being done, he had the grapes gathered, purple grapes, those with large berries, the Numidian, and hard-berried sort, and immediately immersed the stalks in boiling pitch, and put each sort of grapes in separate jars, so that the bunches did not touch each other; he then fitted on the lids to the dishes, which he smeared with a thick coat of cement, and then plastered them with hard pitch melted at the fire, in such a way that no moisture could penetrate to them: finally, he plunged these jars in spring water or in a cistern (or in wells, according to Pliny, lib. xv., in which it is said, ‘ Columella auctor est in puteos cisternasve in fictilibus vasis pice diligenti cura illitis mergi’), and put weights upon them, so that no part of them might emerge from the water. By this means the grapes were preserved in good condition ; but, when they were taken from the water, they turned sour if they were not consumed the same day.”—*Giuseppe Manetti. Monza, Feb.* 5. 1843.

The Bokhara Clover and Physospérmum cornubiénse.—I thank you much for the seeds of the Bokhara clover ; I have given some to one of my brothers, who will also commence a series of experiments with them, the results of which shall be communicated to you. I will now beg of you to send me a packet of seed of Physospérmum cornubiénse of DeCandolle, as I see it noticed in several papers [see our Vol. for 1842, p. 528.] as a plant which cattle eat with avidity.—*Id.*

Double Flower-Pots. (p. 136.)—It is remarkable that both I and Mr. Stephens should have proposed to have water at the outside of our pots ; and that Mr. S. has no pecuniary object in view any more than myself. He states that there are but few creeping insects that will venture to cross from one rim to the other when the space between is full of water ; but there is one creature which, I think, will pass, and that is the slug. In the first volume of the *Gardener's Chronicle* a controversy arose respecting the galvanic protector. I was induced to try several plans to prevent the slug from destroying the flowers, and I found that riveting a piece of zinc to the rim of the pot, as in *fig.* 53., answered the purpose. The slug was able to shoot out its body and feelers, and pass over water ; now, if the space betwixt the rims in the pots fig. 17. and 18. in p. 136. is not above 1½ in., the slug will pass from one rim to the other, although there is water. *Figs.* 54. and 55. show the slugs passing from one rim to the other. The hinder part of the slug being fixed on the outer rim, it is able to shoot out its body to a certain length, so that if it be able to get hold with its feelers and mouth on the inner rim, it finds no difficulty in drawing its body up after it; therefore, to make those pots sure, the space betwen the rims should be more than 1½ in. wide. I have never proved whether the slugs will or will not pass through the water ; and I only wait the return of the slug season to put them to the test. The result I hope to communicate to you, if I am spared to live, and try the experiment.—*M. Saul. Garstang, March* 6. 1843.

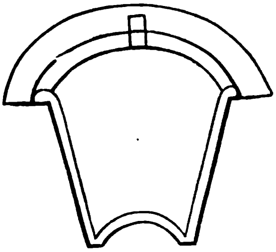


Fig. 53. *Half of a Flower-Pot, showing a Band of Zinc riveted to the Rim, to deter Snails and Slugs.*

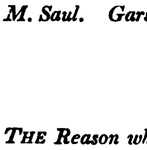


Fig. 54. *Section of Mr. Stephens's Pot.*

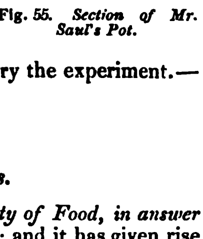


Fig. 55. *Section of Mr. Saul's Pot.*

ART. III. *Queries and Answers.*

THE Reason why Bees sometimes die while they have Plenty of Food, in answer to a Lady Bee-keeper.—This does happen, though rarely ; and it has given rise to various conjectures. The most plausible reasons are, that some accident having befallen the queen, the bees have got unsettled, and many of them have perished abroad ; the few remaining in the hive being too weak to keep up the requisite heat, on account of which the honey becomes candied, and unfit for nourishment. Although these are the reasons usually assigned, still it is more likely that a Lady Bee-keeper's bees died on account of the queen being unfruitful; there being an insufficient number of bees in autumn to supply the places of those dying off. If the following observations are applicable in this case, we may conclude that her bees died by the latter way. Last year I had a hive, called a flight or second swarm, in a large skep full of combs. During the season the bees collected plenty of honey, but their increase in number was small, and afterwards they got very weak, owing to there being no brood reared, though there was plenty of brood bread in the brood combs, which showed there was no fault in the bees, but in the queen not being prolific. On the 26th of December the hive in question contained about ten pounds of honey and only a handful of bees, including the queen, in a weak state. I may add, that, in all cases that have come under my notice of hives becoming tenantless during winter whilst they contained honey, there were always but very few dead bees found in them. This coincides with what I have stated, viz., there being an insufficient number of bees in autumn to supply the places of those dying off. — *J. Wighton. Cossey Hall Gardens, March* 6. 1843.

Art. IV. *Obituary.*

Died, March 7. 1843, at his house in Randolph Crescent, after a short illness, *Sir John Robison*, K. H. " His father was the late Professor Robison; a man still remembered with veneration by many persons now alive, and one of whose talents and virtues Scotland may justly be proud. Sir John Robison passed much of his early life in India; but for many years he has resided almost constantly in Edinburgh, where his energy in carrying out projects which he considered to be of public utility, his zeal in making known merit amongst ingenious artificers and others, in introducing improvements in the mechanical arts from abroad, and in carrying out his own elegant contrivances, obtained for him a well deserved reputation. His original inventions, which were numerous, were always announced with simplicity and conciseness, without parade of learning or indefinite promises of merely probable benefits to result from them. They were almost invariably accompanied by specimens of his exquisite manual skill, in which, considering the vast variety of practical subjects he was conversant with, he was probably surpassed by no one.

" Sir John Robison was for many years the indefatigable secretary of the Royal Society of Edinburgh; and, from the foundation of the Society of Arts for Scotland, he was one of its most active members, and finally its president. He received the honour of knighthood from Queen Victoria in the first year of her reign.

" It must be added, that at his house foreigners of any merit or distinction were constantly received in the most friendly manner, and introduced to persons of congenial tastes. His name is known, and his loss will be felt, far beyond Scotland or England. There are few countries in Europe which have not, at one time or other, been represented at his hospitable board." (*Scotsman*, March 8. 1843.)

Sir John Robison has contributed various valuable articles to this Magazine, and many to the *Architectural Magazine*, and the *Encyclopædia of Cottage Architecture*. In the *Supplement* to that work is given a description of the house in which he died, and in which he had combined, with complete success, every contrivance which he considered requisite to comfort and elegant enjoyment. The contriving and superintending of the execution of this house occupied Sir John's attention for several years, and the result may be pointed to as one of the best models of a town-house in existence. We mention these things in testimony of our great respect for the deceased, both as a friend and a practical philosopher. — *Cond.*

THE

GARDENER'S MAGAZINE,

MAY, 1843.

ORIGINAL COMMUNICATIONS.

ART. I. *Comparative Physiology.* By R. LYMBURN.

THE knowledge of the science of physiology to practical men is valuable, as teaching them the functions of the various parts of plants, and enabling them to apply the necessary food and training in the best possible manner. Different climates, seasons, and soils require different treatment; so likewise do different plants and different states of the same plant; and a knowledge of the way in which the different functions are performed enables us to apply the necessary food at the best time, in the best condition, and with most economy. This knowledge, when acquired by practical men, is also valuable to science, as enabling those who in their every-day practice have opportunity of observing the works of nature on a great scale (as performed by nature itself in a manner that cannot possibly be wrong, if correctly observed), to examine and correct the rules laid down by theory. The experiments in the laboratory are necessarily on so small a scale, as compared with the great laboratory of nature, that some small circumstance omitted may, though trifling to the limited extent observed, be of sufficient magnitude to derange the conclusions of theory. Practice and theory should thus be mutually beneficial to each other; the conclusions drawn by scientific men from interrogating nature in a superior manner, by means out of the reach of practical men, should, if correct, be found to correspond with the observations of practice; and, by the constant application of the one to the other, both will be benefited. The desire of practical men to benefit from the deductions of science is at present so great, as to have called forth the exertions of many eminently scientific men to popularise theory, by simplifying the subjects treated of, so as to bring them to the capacity of the cultivators of the soil.

Among the many helps towards the simplifying of the subject, that of *comparative physiology* is a valuable assistant, By comparing parts we do not understand in plants, with those which are already familiar to us in animals, we get a more comprehensive knowledge of their functions. By examining the function also as to the manner in which it is performed in plants, we get a knowledge of it as performed in its most simple condition, and are better enabled to understand the more complex performance of the function in animals, and to separate what is essential to the function from what is only a more perfect, though more complicated, manner of performing it. It is necessary to know the functions which the different organs perform before we can estimate their value, or know the necessity of supplying them with proper food; and the more we can simplify the subject, by classifying one organ in one organised being with one destined to a similar purpose in another, we the more readily arrive at a general knowledge of the whole. We get possession of a few leading facts, to which all the others are subordinate, thus enabling us to arrange the whole in our mind by a comprehensive idea of the leading points. We acquire a knowledge that such functions as *absorption, circulation, respiration, secretion, nutrition,* and *reproduction,* are absolutely necessary and indispensable in all organised beings. When we wish therefore to acquire a knowledge of any individual, our exertions are directed to obtain a knowledge of the parts or organs destined to perform these leading functions, and to know how far they agree with, or differ from, the normal general state of these organs, without which we are unable to know how they should be fed or trained.

There are difficulties undoubtedly in comparative physiology, and it may not be possible exactly to reduce the subject to a definite order; but it greatly assists our comprehension: and these difficulties have been ably cleared up in the second edition of the work recently produced by Dr. Carpenter on the above subject; which is so elaborate, comprises so great a quantity of condensed information, exhibits inferences deduced therefrom so ingenious and varied, and developes so many new views, that I have thought it might interest your readers to have a few of the leading doctrines stated, and contrasted with those of other physiologists, with such comments thereon as may appear useful. Of course it will only be possible to give such an outline of the subject as will convey the leading ideas; but even this, it is hoped, will be profitable, and stimulate those who are anxious for further information, to examine the work itself, and judge for themselves on the mass of information brought forward there under each separate head. The main object in the work is, to exhibit the connexion between the different grades of organised beings, to point out the resemblance between plants and animals in their functions, and to trace the connecting links in both, from the lowest up to the highest forms, and from the commencement of reproduction up to maturity. It has been thought by DeCandolle, Fries, and many others, that the best view of the subject is to study the function in its most complete form, in the highest classes of beings: but Dr. Carpenter gives good reasons for the opposite opinion; it is in the lowest forms of organised beings, and at the commencement of life, that the performance of the function is seen in its most simple condition, and the most complete knowledge attained of what is essential and indispensable in its due performance.

In the *Preliminary Remarks* in the Introduction, he commences by stating that Physiology regards the functions or actions of living beings, and notices the difficulties attending the investigations of physiologists. "The chemist, when desirous of establishing to which of the ingredients in a given mixture a particular effect is due, places each separately in the conditions required to produce the result; while the physiologist finds that the attempt to insulate any one organ, and to reduce the changes performed by it to definite experimental investigation, necessarily destroys or considerably alters those very conditions under which its functions can be normally performed." This is the fruitful source of error in all physiological experiments, and the cause why *practical* experiments on a large scale are so necessary to corroborate and confirm the deductions of theorists. Many theories, which from the illustrious names by which they were brought forward appeared to carry a warrant with them, have not been found to stand the test of experience. The operations of nature, though simple, are so many and complicated that some very minute, though important, circumstances have escaped observation. Portions of organs are more easily insulated in the *Vegetable Kingdom*, and he recommends therefore to commence with it, where the simplest manifestation of the functions of the lowest grades of organised beings enables us to comprehend and explain the complicated phenomena of the highest.

On *organised structures in general*, he regards inorganic or mineral substances as held in connexion by electrical attraction merely, every particle possessing a *separate* individuality. They may be decomposed as organised substances, but not to the same extent. "It may be regarded as the peculiarity of an organism, that all its distinct parts, in their own way, subserve a *general* purpose, and conduce to the maintenance of one whole. The *individuality* of a mineral resides in each *molecule;* that of a plant (or inferior animal) in each member, and that of one of the higher animals in the *sum of all the organs.* Change, in organised bodies, is essential to our idea of life, and is the rule; in inorganic substances, permanence is the rule and change the exception. In organised beings there are additional forces to those of inorganic, resulting from properties nowhere else to be found, and for which physical laws will by no means account. The distinction between organic and inorganic bodies is complete: the simplest of aerial flags, as the red snow, &c., as well as the most simple animalcules, grow from a germ, increase, reproduce, and die; each, after its own kind, arranging their particles in the same definite manner. The links between the animal and vegetable kingdom are close and mutual; but there is a total want of resemblance in the mode of aggregation by which minerals are held together."

Some have held that it is difficult to distinguish between infusorial animalcules, as nomades and vibrios, and inorganic substances acted on by electricity. In the hardest animal bodies particles have been found which have motion, and yet are without life. Life, however, as explained above, is separated from motion; it is vague and absurd, he says, to infer from these motions that all matter is possessed of vitality.

The distinction between the vegetable and animal kingdom is more difficult; the above definition, however, of plants possessing individuality in each member or joint, and animals only in the aggregate, is the most useful for practice. Sensibility has been thought distinctive; but some plants possess something so like sensibility that it can hardly be distinguished from it, and some of the lower animals, as hydatids, appear insensible to stimuli. Plants have been said to live only on inorganic, and animals only on organised, food; but Sir Humphry Davy found plants to thrive on sugar, gum, jelly, &c.; and, as the deposits of starch, &c., laid up for the food of young buds, germs, &c., in the spring, are capable of affording nourishment, it seems natural to infer that organised substances so minutely divided as to be capable of absorption may be decomposed in the same way and serve as nourishment. Müller (vol. i. p. 4.) says, "plants are nourished by organic substances in solution, that have not wholly undergone decomposition, and also generate organic compounds from inorganic." Dr. Lindley distinguishes between the two kingdoms, by plants being destitute of locomotion, and being congeries of individuals; which is the most obvious, and perhaps the best, method of distinction. It is true some animals divide spontaneously, and some are capable of doing so artificially; but they are so nearly allied to plants as to have been sometimes classed among them. Some plants also, as mushrooms and other cellular plants, will not propagate by joints as other plants do, their multiplication being principally by ascini, thecæ, spores, &c. The Monocotyledons also do not divide so well into propagating joints as do the higher classes of plants. Yet, throughout the whole kingdom generally, the capability of division artificially and spontaneously is characteristic of vegetables. There is perhaps no absolute distinction between the two kingdoms; but it is the most obvious and most general. The editor of Cuvier's *Règne Animal* thinks vegetables and animals will be best separated by their products; the whole animal kingdom producing hard bony substances, either internally, as in the higher classes, or externally, as in the lower polypi. The duration of existence is in the higher classes of plants very distinctive as compared with animals. In animals there is a period of maturity and decay, which we cannot well arrest by any circumstances we can place them in; in plants, on the contrary, especially in Exogens, the period of decay, in natural circumstances, is greatly prolonged beyond that of animals. By cutting in the tops and roots and removing the soil, or by propagating from pieces of the plant, we can arrest their decay to an apparently unlimited extent. It is no doubt true that plants from seeds are generally more vigorous than those from other portions of the plant; but the long period in which such plants as limes, poplars, &c., have been propagated from pieces without appearing much exhausted, seems to infer a power of prolonging their existence to which there is nothing comparable in animals. Even in annuals and biennials the life of the individual may be much prolonged by preventing it from fruiting, and by propagation of parts, in a much more extensive way than in the artificial or spontaneous division of the lower animals, and to which there is no parallel case in the higher. In plants it is the rule, in animals the exception.

In enquiring into the way in which *vital* forces harmonise or interfere with those common to other forms of inorganic matter, he says: " In the structure of organised beings may be detected an arrangement of the ultimate particles very different from that which crystallisation produces in minerals; it is a mixture of solid and fluid substances, flexible and elastic, not rigid and brittle like animals. In plants the solid substances are more diffused through the body, more external than in animals, unless in the lower classes. The softest parts, and those most subject to decay, are the places where the activity of the living principle is strongest, as in the spongioles of the roots of plants, and the nervous matter of animals. No elementary substance, however, is found in these, which does not occur in the inorganised world. The parent communicates to its offspring, not so much the structure itself, as the power of forming this structure from the surrounding elements. Of the fifty-four elementary substances found in minerals, only eighteen or nineteen are found in plants and animals; many of these in extremely minute proportions, though, perhaps, not the less necessary." On this head he afterwards quotes Sir J. Herschel's demonstration, that a force 50,000 times that of gravity may be instantaneously generated by the action of galvanism on an amalgam of mercury, with a millionth part of its weight of sodium; thus showing that the minutest mixture of ingredients may completely reverse the electrical, and consequently the chemical relations of large masses of organised matter. "The bulk of the inorganic world is made up of the metals and their compounds; while the essential ingredients of living bodies are the non-metallic elements, oxygen, hydrogen, nitrogen, and carbon; carbon being the most characteristic in vegetables, and nitrogen in animals. Chemical affinity, the result of the electrical properties of bodies, is affected by temperature; the affinities of potassium and iron to oxygen are reversed by different states of temperature. A distinct set of *vital affinities* can hardly be distinguished from chemical, by saying that all organic substances decompose upon the loss of vitality. It is, therefore, scarcely a proper definition of life, to say that it is the *power* by which *decomposition is resisted;* it is rather the provision for the removal of particles in a state of incipient decay, and their replacement by others freshly united. Carbonic acid, the first product of putrefaction, is the substance given off most copiously during life, as well as death; the interstitial or lymphatic replacement fully compensates for the tendency to decay; if this is prevented, decomposition and loss of vital properties ensue."

It appears, therefore, he considers the power of life to consist more in the insterstitial displacement of decayed and replacement of sound particles, than in the prevention of decomposition, because inorganic substances are also acted on differently in different circumstances. It is not clear, however, that the tendency to decompose is not much greater after dissolution than before; the removal of decayed particles preventing accumulation will not, perhaps, account for the much less tendency to decompose during life. After death, all the particles, both sound and decayed, appear to be more acted on by chemical affinity; and hence the general opinion that vitality furnishes a resisting as well as replacing power. The waste of the body producing decay may be distinguished from chemical affinity, having a power of displacing the weakened decayed particles, which it does not possess over the sound ones; and may thus be prevented, by vital force maintaining the sound parts in a condition capable of resisting chemical action, from interfering with them, while it removes all those particles become unsound from waste. The carbonic acid given off by animals will be partly also from substances not assimilated; perhaps partly so in plants also. The power which enables living bodies to with-stand a heat of 260° appears more than lymphatic action would account for. The power of assimilation is a vital affinity, which has not been imitated or understood yet. The power of light has been said by some to be wholly chemical, but others regard it as acting greatly by the stimulus it gives to the power of the secreting organs in the leaf. The gastric juice of the stomach is said to act on and destroy dead matter, even the stomach itself after death; but to have no power on it while living, because protected by its vital properties. The egg resists putrefaction at a great degree of heat while alive; but, if the electric spark be passed through it to destroy life, it soon commences to putrefy. The blood of the animal, and sap of the plant, though extravasated, will live and become organised, if connected with the living system. The blood has been said to be kept in a fluid state, and tendency to solidify prevented, by its vital properties; it is said to solidify if forced through dead tubes. Chemistry has lately been able to imitate some actions considered as vital: starch can be formed from woody fibre, sawdust, bark, and other substances; sugar and gum from starch, &c. These chemical transformations have been principally, however, in the descending series (though woody fibre has been said to have been formed from starch by nitric acid and chlorine), and they have been produced chiefly on what are called organisable or proximate principles. It has not yet been thought possible to form any of these from their elements of carbon, hydrogen, and oxygen; at least none have succeeded in doing this, though Professor Thomson, in his *Vegetable Chemistry*, seems to think we may yet do so. It may be, that chemical affinity is the principal agent by which living organised bodies are produced, as well as inorganic combinations of dead matter. But if so, that agency is controlled by a power which we can only as yet feebly imitate in the production of organisable proximate principles. I fear the day is far distant when even these will be produced from their elements; but, though we should attain so far, when shall we hope to be able to imitate the power of assimilation which can from such organisable products, through the mere agency of cells in which no distinguishing anatomical difference can be found, cause so many and such varied secretions and assimilations to take place, and combine the whole in one system, in which all the parts so mutually harmonise with each other? Such opinions as the above, and others, on vitality, &c., have by some been said to savour of materialism, but erroneously; as the wisdom of the Creator may be as well displayed in working by one agent as another.

On the *elementary structure* of vegetables, he divides the subject, as in other similar works, into — 1. *Cellular Tissue;*

2. *Woody, or Fibrous, Tissue;* 3. *Vascular Tissue;* but has the new addition of, 4. *Laticiferous Tissue.* "The basis of all the elementary tissues may be considered as *membrane* and *fibre;* the one, perhaps, formed by the adhesion of single particles in expanded surfaces, the other by their union in lines." Some have thought them produced by the different kinds of electricity; that which gives out the brush producing membrane, while that which gives off the electrical matter in a pointed form produces fibre. Vegetable membrane he defines as permeable to fluids, though always, unless in some very few instances, destitute of visible pores. Elementary fibre he compares to hair of extreme tenuity, often not exceeding $\frac{1}{12000}$ of an inch, usually disposed in a spiral direction; the adjacent threads having a peculiar tendency to unite and grow together; whether hollow or solid not easily determined. The descriptions of the tissues are similar to those of other authors. *Cellular tissue,* varying from $\frac{1}{30}$ to $\frac{1}{3000}$ of an inch in the diameter of the cells, is capable of growth in all directions, forming the parenchyma, or flesh of plants, and the great bulk of the organs in which active vital processes are performed. A modification of this (the elongated cellules of De Candolle and others) he describes as vasiform tissue, the largest of all kinds of tissue formed by the union of cells laid end to end, the partitions between them being more or less obliterated, thus forming a continuous tube. The descriptions of *ligneous tissue,* or woody fibre, forming the essential organs of support, constituting first the alburnum or sap wood, and afterwards, by the deposition of various secretions in its tube, forming the duramen or heart wood, with its modifications in the Coníferæ, or fir trees; as also of the *vascular tissue,* distinguished by possessing a spiral fibre coiling within its membranous tubes from end to end, resembling the tracheæ or air vessels of insects in always containing air, though, being closed vessels, the gaseous contents have to permeate the delicate membrane of the tubes in plants closed at the end. These are described in a manner so similar to other elementary works as to prevent the necessity of lengthening out the present essay by any more detailed account. The *laticiferous tissue* he describes "as consisting of a series of branching tubes anastomosing with each other, so as to form a network, in which the *latex,* or elaborated sap, flows. This branching character is its chief difference from other forms of tissue; the walls of the vessels, though very thin and scarcely visible in the young plant, become thickened afterwards, but the structure is not different from what we find elsewhere. The sides are not parallel as in other vessels, but often contracted and expanded at intervals; the average diameter about $\frac{1}{1400}$ of an inch. This tissue is present in most

flowering plants; but, lying in no regular direction in regard to the other vessels and fibres, have been commonly overlooked. They resemble the capillary vessels of the lymphatic system of animals; but, in elementary structure, do not differ from vegetable cellular tissue; the branching character being due to an arrangement of the primary cells, in which these tubes originate."

The tissues he thinks, to a certain extent, transformable; all the tissues have been said to be formed of the cellular. He is of opinion, that in animals it is not so much from the cellular matter, ordinarily so called; the cellular, like all the other tissues, being preceded by the existence of a semitransparent gelatinous matter, of which the entire embryo seems at an early period to be formed, and which may be regarded as a vesicular structure resembling that of the inferior plants and animals. The cells of which it consists give origin simultaneously to the various kinds of tissue, and disappear as they are evolved. Cellular tissue may be transformed into the other vessels, but will retain the form impressed on it. A similar gelatinous semiorganised matter is found in the peculiar juices (cambium) of plants, which is exceedingly apt to assume the appearance of membrane, and is likely similar to that of animals. The opinion seems very general that elongated cellules, dotted ducts, &c., which follow the woody fibre up the stem, and extend into the centre horizontally by the medullary rays, are formed of cells united, compressed, and perforated; and that the spiral cells, or fibro-membranous tissue, as also the different modifications of spiral vessels, are formed from cells round which spiral threads are coiled in various ways, and to various extent; simple, and interrupted, or dotted, as in some varieties, up to the perfect spiral vessel, which is coiled all round. Some have ascribed the same origin to woody fibre, but its toughness and elasticity have been thought distinct from modifications of common cells. They are found formed in bundles, probably from what might have been round cells, but elongated at the time of formation from some peculiar action on the granules. Mirbel says, in watching the evolution of Marchánt*ia*, he found the cells elongate, and spiral fibres to be formed on them; these spiral cells, and the ducts of ferns, he thinks a transition forwards to the true spiral vessel.

"Membrane and fibre compose the vegetable tissues; muscular fibre and nervous matter are peculiar to animals, and, for the most part, restricted to those parts of the fabric subservient to the functions purely animal, namely, sensation and voluntary motion. One of the characteristics of animals is the possession of a digestive cavity, to store up the food for the continued supply of the absorbent system, and cause it to undergo a certain degree of preparation; this addition to the absorbent apparatus of plants being required by the locomotive propensities of animals, and the nature of their food. Nerves and muscles are needed for the motions of the stomach; and for the regularity and constancy of the movements of the blood in the circulating apparatus, the peculiar contractile powers of muscular fibre are needed in the impelling organ, the heart."

The distinction here drawn between plants and animals, in the latter for the most part possessing a digestive cavity, and a special circulating apparatus, points out the soil as the stomach of the plant, and the diffused contractility of the vegetable system, united to the power of endosmose, as the circulating power. As in the stomach and alimentary canal of the animal the food is prepared for absorption, so in the soil, by the action of heat and moisture, and of the air and electricity, the food of the plant is reduced to a soluble state, fit for solution in water, without which it cannot be absorbed by the spongioles of the root, which have been thought, with apparent reason, to have also an action of their own on the food. We all know the necessity of keeping the soil in an open pulverised state, to admit air, heat, and moisture freely, retaining as much as possible of the former, and only as much of the water as can be held in absorption by the particles of earth themselves. The circulation, though of a much feebler kind than that of animals, is carried on by the process of endosmose, or the power of denser fluids, inside of a membranous sac, attracting the thinner fluids outside, by which means the sap is raised to the leaves, where it is elaborated and evaporated to a more dense consistency, and attracts the more fluid ascending sap. This power, united to the diffused contractile power of the vessels, supposed to be caused by electricity, assisted, perhaps, by gravity in the descending sap, produces the circulation, all of which will be found treated more particularly when we come to absorption and circulation. The respiration is carried on through the whole surface, but principally in the leaves. Some have thought the action in the leaves similar to digestion; but though carbonic acid is absorbed, and water evaporated, which causes it to differ from animal respiration, and though the chemical power of transformation in the sap is no doubt assisted by light, yet similar transformations take place in the blood of animals, where light does not act, and perhaps too much is ascribed to the power of light on the leaves.

The power of light is, perhaps, as much stimulant as chemical, as light itself without the leaves will not act as it does with their assistance. Aeration in leaves, though different from that in lungs, is likely a similar function. At all events, in comparative physiology, leaves can only be viewed as the respiratory apparatus, if we wish to classify organs for the purpose of comparing them together. There will also be found a correspondence between plants and animals in the manner of performing the remaining functions of secretion and reproduction, when we come to these.

He next takes a *General View of the Vegetable Kingdom*, which he computes at between 70,000 and 80,000 distinct species already existing in collections, and probably as many more still undiscovered. He notices the difficulty of laying down perfect distinctions between the different groups, and fixing distinctive characters. "The Phanerogamia (or flowering) and Cryptogamia (or fruitless plants), two great primary divisions, are distinguished by the want of vessels in the latter; being mostly a mass of homogeneous cellular matter, having absorption, circulation, and aeration performed by the whole mass. The ferns and mosses, however, belonging to Cryptogamia, have a woody stem, and evident indications of vascular structure, though no true spiral vessels; there are also some species of Phanerogamia to be found in which spiral vessels cannot be detected." He continues to trace the anastomosing of the different tribes with one another, and the difficulty of fixing on any distinctive points of difference, in consequence of the connecting links which run through the whole. The belief that there is no such thing in nature as abrupt transitions is more and more confirmed as new plants are discovered, to fill up what were formerly reckoned as wants. This is a bar in the way of distinct separative definitions of plants, which greatly facilitate the acquirement of names by the analytical method.

Artificial classification depends more on single characters; natural, on a mass of characters. The natural method is better fitted for synthesis than analysis; the most distinctive analytical characters of natural systems are artificial. External characters are most easily discerned, and, in systems of botany, simplicity is greatly promoted by using external characters. In the primary divisions of the natural system of botany, external characters can be traced to correspond with the internal; they have real distinctions in nature, and appear to be created by nature as independent forms of organised matter. Their peculiarities are connected with their whole nature, and not with modifications of particular parts merely. There are, no doubt, connecting links, but they do not confuse, and the distinctions in the primary classes are obvious and easily observed. As we descend, however, in the scale of division, natural distinctions are not so obvious, and the lower divisions of natural systems are in great part artificial. A knowledge of the names of plants is the first and most essential step in botany. We must know the name of a thing before we can speak of it, or understand what is said about it; for the acquirement and communication of knowledge names are alike necessary. For the acquirement of names, especially in small local floras, the Linnæan was the most easy; many of the classes were natural, and some forcible separations from them, by abortive stamens, &c., were remedied, in some works, by references at the stations to which alterations, &c., would lead. To gardeners, and other students in the country, where botanical named collections cannot be referred to, the Linnæan system is most simple, and the distinctions most easily remembered. The most popular works were also based on that system, and in such as the *Botanical Arrangements* of Withering, Smith, Hooker, &c., so much attention has been paid to individual plants, from their number being more limited in local floras, and the facility of reference to plants growing in a state of nature, that the distinctions were very marked, and the plants comparatively more easily decided on. In the natural systems a greater mass of characters are grouped together, and it is more easy to combine them synthetically; but the arriving at the name is an analytical process, and it is more labour for the student to select distinguishing characters among so many as are generally given in natural systems. To the student in the country, who has not the benefit of a preceptor, nor of a named collection, the natural systems are likely, therefore, to appear, at least at first, more repulsive.

The deficiencies in the Linnæan system, however, have become more apparent, from the immense additions lately made to the number of plants. In small local floras these defects were much remedied by references; but the separation of natural groups required to follow it up completely, in the general flora, were many, and hence natural systems are now most generally approved of. They combine plants more according to their natural affinities; which, though found to anastomose together in the extremities, are yet, for practical purposes, sufficiently distinctive to enable the mind to comprehend and arrange them in groups, which assist the memory to retain a comprehensive idea of the whole, and refer them to their stations more easily than under artificial characters. When orders, alliances, and groups are properly based on real, not analogous, affinities, by a strict conformity in the essential parts of fructification, as in the grasses, composite flowers, Labiàtæ, Crucíferæ, &c., it greatly facilitates the comprehensive idea of the whole in parts. Even genera, as *R*òsa, *R*ùbus, &c., often admit of distinctive natural affinities. Most of the divisions are, however, still artificial, and natural systems are still very imperfect; sufficient attention has not yet been paid to the drawing out of the distinctions of plants, in permanent structural differences. In works of descriptive botany, one single such character is of infinitely more value than an immense mass of others, which only tend to confusion. Much has been done by Lindley, Bentham, Brown, and others, to remedy these defects, but much remains still to be done. Distinctions of species are confined to superficial and external characters, the higher structural characters being reserved for the higher divisions, which are generally confined to fructification, though sometimes very permanent characters are to be had from less essential parts of the plant. Great experience and judgement, and much reasoning from physiological knowledge, are required in deciding what are permanent characters and what only transitory; and the want of attention to this has been the cause of much confusion, both in species and genera. Much confusion has arisen from the many different names given to the same plant, by selecting mere varieties as species; by the splitting of genera that might well have stood together, and uniting others that had no call to be so. Undoubtedly many of the changes are necessary; but they greatly tend to confusion, and it would be well if botanists would attend to the rule laid down by some of our most eminent scientific men, rather to put up with trifling inconveniences than to change without urgent necessity can be pleaded. It would be well if, as in pronouncing dictionaries, some preeminent authority could be decided on to which all might bend. Much money has been lost needlessly in purchasing what was before possessed, and the public are getting tired of changes, unless good reason can be shown for them, and a prospect of their being permanent. There is much need for some energetic methodical mind, like that of Linnæus, to bring order out of confusion.

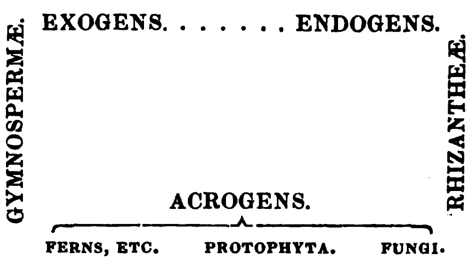
In the lowest groups of plants, as fungi, lichens, algæ, &c., it is not easy to define them, he says, by their structure. "Lichens, if removed from light and over-supplied with moisture, have a tendency to assume the appearance of algæ. In such simple forms of vegetation as Protoccócus nivàlis (red snow), Palmélla cruénta (gory dew), and the nostoc or fallen star, there is only a simple aggregation of vesicles without any definite arrangement; sometimes united, sometimes not, and by their rupture giving existence to the germs contained within. By some they have been placed among algæ, by others among fungi, by others among lichens. In beings of such simplicity, there are no definite characters to determine their affinities." He next traces the ascent in the scale of existence from minute fungi, as mould, mildew, &c., in which the absorbent nutritive and reproductive functions appear confounded with each other, up through mushrooms, in which a distinct stem is developed separating the pileus or cap, the reproductive system from the nutritive of the root, showing how a progressive complication of form arises without any alteration of the original characters of the simpler members of the group, and conducts upward to the higher classes. The Cryptogamia and Endogens are connected through Rhizántheæ, which resemble the former, but have spiral vessels like the latter. Endogens, again, are connected with Exogens by the Conferæ, which have the vessels distributed in a manner approaching the Endogens in some, and, from the want of perfect spiral vessels in others, approach the cryptogamous lycopodiums.

On the question whether the lower plants, as fungi, are developed from distinct germs, or generated by processes antecedent to their formation, by what has been called spontaneous generation, he says: "the infinite number of sporules the fungi produce, stated by Fries as ten millions from a single individual, so subtle as scarcely to be perceptible, and so light as to be raised by evaporation, and dispersed in so many ways by attraction, insects, wind, elasticity, &c., renders it difficult to conceive a place from which they can be excluded. The germs thus constantly floating in the atmosphere are developed according as the nature of the decomposing matter they alight on is respectively adapted to each, showing why certain kinds are always found in certain situations." In the fungi found on roots it is still more curious how each is adapted, and to be found in the several situations. No sooner are the roots protruded from some plants, than their own peculiar fungi are to be found on each, and nourished by the peculiar excretions of the roots. "The same germ may, however, assume widely different forms, according to the circumstances which influence its developement; and it would seem the absolute number of species among fungi is not nearly as great as has been usually supposed; and that the kind produced by a decomposing infusion, or a bed of decaying solid matter, will depend as much upon the influence of the material employed as upon the germ itself which is the subject of it." On this head he quotes the great number of species, and even genera, which have now been found, by Fries and others, to be only different states of the same species; and the appearance of different species in fluids, in Dutrochet's experiments, according as acids or alkalies were added. This subject is again resumed in the chapter on Reproduction; it is to be wished, however, that such variations should rather be referred to incompleteness in the characters of species by the botanist who first named them, than to any uncertainty in the developement of germs, which savours too much of equivocal generation, and, if once admitted, might tend to confusion. There are so many ways of one germ being substituted for another, and it is so nearly impossible to guard against this, and the variations of species are so apt to be classed as distinct species even in the higher plants, that the facts observed may be resolved perhaps better into these than any other.

On the question whether fungoid growths on leaves, &c., may be regarded as degenerations merely of the tissue on which they grow, he quotes the opinion of Unger, that blight, mildew, smut, &c., are diseases of the stomata; the Exanthemata (eruptive fevers) of vegetables. "The state of our knowledge at present is not such as to enable us to decide whether, as reproduction seems only to be a peculiar form of nutrition, if its regular form of developement be prevented, it may not give origin to beings of more simple organisation, and these fungi be formed in place of higher forms of existence." "Many substances once thought fungi," he says, "are now found to be only accidental and irregular expansions of the tissues of flowering plants, become deformed through growing in the dark, as in cellars, caverns, &c. Animals and plants are both liable to the growth of fungi within their bodies."

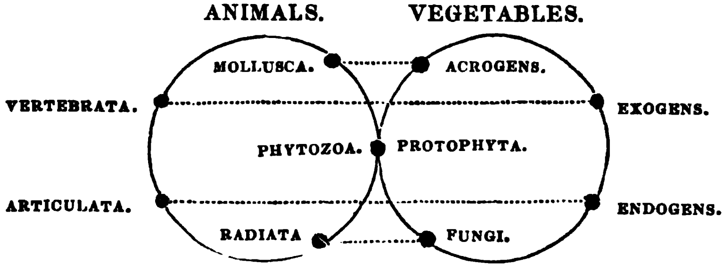
To say that degenerations of tissue might give rise, when prevented from higher developement, to beings of more simple organisation, is not so indicative of divine wisdom, as to say that the diseased morbid matter of the tissue formed the food of the germs of an inferior being. The germs of these fungi have been generally thought to give rise to blight, mildew, &c. They undoubtedly appear as diseases of the leaves, whether of the stomata or not. Whatever checks growth appears to cause a morbid diseased state of the cuticle on all the places where growth is most active. When beeches, especially large plants in hedges, are stopped in their growth by spring frost and drought afterwards, the diseased state of the leaves and young shoots appears in an exudation of sap, which attracts innumerable swarms of aphides. If the weather sets in moist, warm, and encouraging growth, after the check by frost, the disease does not extend so far. It is the same with the larch and some other plants, when attacked by frost and subsequent drought. Thorns do not suffer from frost, but they are exceedingly fond of moist wet weather, and in moist summers I have always observed them to make most growth. In dry weather, if continued long, they never fail to set up in growth, and the whole quarters of that plant in the nursery grounds become white in the foliage with mildew. It has been generally thought to arise from the imperceptible germs of mildew floating in the atmosphere, which, from the diseased state of the leaf, have (like the insects attracted in the case of the other plants) found here their proper food, without which their developement could not take place. If this were an eruption from the stomata, it should appear most on the under side of the leaf; but the reverse is the case; it appears principally on the upper side of the leaf; and, when refreshing showers commence and continue for any length of time, it is washed off the leaves, and the plants start into a new growth. Sulphur sprinkled on the mildew also banishes it, and is thought to kill the fungus. It appears more in the light of an exudation through the cuticle attracting and feeding the fungi, than an eruptive fever of a substance resembling fungi through the stomata. A cold drought appears to have more effect on most plants subject to mildew on the leaves, as peaches, peas, &c., than a warm drought; but drought appears the most active agent with most plants in producing this disease. Any state of the weather however, or soil, that will arrest vigorous growth suddenly, appears to cause it. That it is a real plant and not morbid matter, I think may be proved from the fact that, where peach trees on walls have been much infested with it, it has been found in the soil of the border around the roots; and the disease could not be banished, in some instances, till the soil was totally removed and the plants washed all over. That fungi will propagate in this way, I have had ample proof in the willows in our nursery, which were attacked by an orange yellow fungus, which in the first year appeared to have been wholly external in its ravages; but in subsequent years appeared to have been partly, and latterly almost wholly, taken up by the roots and conveyed to the leaves; as the eruptions occurred principally on the veins and midribs of the leaves, and the cuticle was evidently thrown up outwards and not pushed inwards, as in the first season. The mildew in frames is caused by damp, not drought, and is removed by exposure to dry air. It takes place on the surface, and appears a putrefaction of some substances on the surface of the soil, which communicates to the neck of the plant and destroys it, and does not appear a diseased state of the plant itself. Moisture in excess should be more apt to kill by canker, ulcer, or gum, than by mildew: some gardeners have thought wetness a cause of mildew on peas; Mr. Knight, however, always considered it to be caused by drought, and I should think it most likely. He calculated 250 millions of seeds from a single mushroom in ninety-six hours. Mildew cannot be generated by the plant itself, he says: the cause, he thought, was the want of moisture and food to the roots, causing stagnation. If wetness caused stagnation of growth it might end in mildew, but I should think it not so likely. He notices the discovery of fungi in yeast, but does not say whether he thinks them a cause or consequence. Liebig ascribes fermentation to the presence of nitrogen, and says, it will not commence or go on without nitrogen; but neither would fungi grow without it; and, notwithstanding many eminent men ascribe fermentation to fungi, it appears still doubtful.

The affinities of the principal divisions of the *Vegetable Kingdom*, he says, may be generally expressed in the following manner:—



"Starting from the simplest algæ and lichens, which resemble one another closely in every respect, unless their locality, and which are classed under the general name of Protophyta or simplest plants, we may pass on the one side, through the Hepaticæ and mosses to the ferns, the highest among the Acrogens, or Cryptogamia. From mosses and ferns the transition is easy, through the Lycopodiaceæ (club mosses) and Gymnospermæ (Coniferæ, &c.), to Exogens. Exogens and Endogens have many connecting links; and, from the latter group, the return to the fungi is direct by the Rhizantheæ, whilst the simplest forms of the fungi bring us back again to the Protophyta."

In the next chapter, he traces the connection between the different groups of animals and the manner in which their affinities unite and separate, showing the connecting link between the lower and the higher, and their gradual approximation to one another. In tracing the manner in which the grand divisions are connected, and enquiring how far these divisions may be regarded as analogous to those of plants, he expresses their affinities as passing from Phytozòa the simplest forms of animal structure, through Mollúsca and Cephalópoda, to Vertebràta the highest in the scale, and returning by Articulàta, through *Ho*lothùridæ and Radiàta, to Phytozòa again. If these divisions be admitted, he says, "as expressing the principal types of structure, a very curious series of analogies may be pointed out, which indicate their correspondence with those of vegetables. In making such comparisons, it should be carefully kept in mind that we must not expect to find among plants any characters analogous to those peculiar to the animal kingdom; and that we must be guided, rather by the general plan of structure and arrangement of the organs, than by any of those details which, in the higher classes of animals especially, are so much modified by their connexion with the function of relation. Perfection in the vegetable kingdom having reference to the nutritive system alone, whilst among animals it is the manifestation, in the highest degree, of the powers of sensation and locomotion, and of the psychial faculties connected with them. Keeping these principles in view, we proceed to point out the affinity between Phytozòa, the lowest group of animals, and Protóphyta, the lowest of plants. They approach each other so closely as to be distinguished often by supposed differences only. They correspond in their nutritive functions, the lowest in each absorbing by their whole surface. The lichens absorb by one surface only, and in this resemble Polypífera, which have the absorbent power restricted to the sides of the digestive cavity, the external surface being excluded by its hardness. Traces of the higher animals have been found among the lower, as if Nature, at the commencement of her work, had given us a sketch of the different forms she intended to adopt in the higher parts of the scale. So, in like manner, among the lower plants, in Protóphyta, traces of Endogens and Exogens may be found. The fungi and Radiàta correspond in the tendency exhibited in the higher divisions of fungi to the arrangement of parts around a common centre, so characteristic of the Radiàta (star fish). The ferns have the spiral mode of developement very evident, in the arrangement of the leaves both in themselves and around the stem *, to which the Gastrópoda (typical Mollúsca) approach more than other animals; they also form their shells by additions to the edges, as ferns do their stems by the addition of the petioles of the leaf. The Articulàta (insects) resemble Endogens, in their having the hardest portions or organs of support external; the additions to their tissue being formed from within, and the trachea being distributed, like the tubes in Endogens, through the whole system. Finally, Exogens may be considered analogous to Vertebràta, in the internal situation of their hard parts, the formation of new tissue from without, and the confinement of the internal respiratory apparatus to a particular situation in the fabric. The process of decortication in some plants reminds us of the exuviation among serpents. The following table will place in an obvious aspect the position of the principal groups of the animal and vegetable kingdoms: —



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* Some authors say the spiral is the true mode of developement in plants; and that the radiated or whorled is an arrestment only of that spiral; even the opposite leaves they reckon unnatural.

"Some zoologists divide the animal kingdom into three groups, Vertebrata, Annulosa, and Mollusca; plants would then be Exogens, Endogens, and Acrogens; the Mollusca including Mollusca, Radiata and Phytozoa, as Acrogens do Ferns, Fungi and Protophyta.

"In the foregoing arrangement, what has been called the circular system has, to a certain extent, been adopted. From whatever point we start, we may, by pursuing the various gradations of structure presented to us, return again to the same point. This is characteristic of a natural group, which never ends abruptly, beginning with the highest and ending with the lowest. The typical member of a group is that which exhibits its peculiarities of form, structure, and economy in the greatest perfection; the types of the different groups being always more widely asunder than the aberrant members which connect them. It may be doubted whether the circular arrangement is competent to express all the affinities of natural groups; it is probably better represented by a sphere than a circle; its typical form being the centre, and the aberrant members connected by affinity in all directions. We constantly meet with exemplifications of the circular form in the groups both of plants and animals; but its universality has by no means been established; much less can the number of divisions in each circle be restricted to five, as proposed by some."

On the *Symmetry of Organised Structures*, he remarks, "that besides the uniformity of the parts composing the two sides of the body in the external form of animals, or *bilateral* symmetry, there is a symmetry also in the regular arrangement of many similar parts around a common centre, as in the Radiata, or in a spiral disposition of similar organs around a cylinder, which is the type of symmetry in the vegetable kingdom. In the simpler algæ, lichens, and fungi, the growth is so modified by circumstances that it is impossible to assign determinate bounds to the outline; and hasty attempts to characterise the races by external form have led to much erroneous multiplication of species. In the higher fungi we find the radiated form. In the mosses the leaves begin to be spirally arranged round the axis; and the spiral arrangement is more conspicuous in ferns. In the Phanerogamia it may be regarded as the general law of the arrangement of the branches, leaves, and parts of the flower, that they are disposed spirally around the axis of growth, though the proof might sometimes be difficult from perturbing causes. Opposite and whorled leaves will be rendered spiral or alternate by any cause which gives full developement to the stem. The circular arrangement of the parts of the flower also arises from the non-developement of the axis of the stem. The spiral is evidently formed by the union of a circular and longitudinal motion. When the axis is not developed therefore by the latter, the former or circular prevails. In the lower animals the circular and spiral symmetry prevails. In Articulata (insects) the *bi-lateral* symmetry is carried to its greatest extent, the locomotive powers being developed to their highest extent. In Mollusca the locomotive organs are adapted only for slow and feeble progression; and the nutritive apparatus constitutes almost the entire bulk of the body, and there is a general want of lateral symmetry. In Vertebrata the uniformity of the two sides is only external, the nutritive organs apparently being developed internally on an asymmetrical plan."

The fascicled appearance of the leaves of pines, the whorled leaves of many plants, and the circular arrangement of the parts in flowers, have been termed abortive, from the greater part of the branch, called the axis, being wanting. The doctrine has been carried so far as to call the parts of a flower mutilated leaves. To a certain extent the doctrine is true, as we frequently see a branch developed from the centre of a flower; perhaps, however, we are not warranted to call every departure from a former to a new mode of developement abortion, because parts of the one are wanting to the other. The power which gives the longitudinal or vertical developement to plants is always found associated with the radiated or circular, as in the medullary rays of Exogens, and the circular joints of Endogens. It is found to prevail most in the higher classes of plants, and, united to the circular, to cause the spiral arrangement of the leaves on the branches; but, though in the flower the circular developement overcomes in many instances the vertical, it does not follow that it is by abortion; it is the way in which flowers normally develope, and we cannot say that it would have been more perfect to elongate. It is also repugnant to our ideas of flowers being concerned in the highest function of reproduction, to have them denominated abortions or mutilations. Transformation would be a better term, as it would really seem from stamens and pistils becoming petals, and petals becoming partly or wholly leaves, that they are undoubtedly convertible forms, according to the nature of their food and other circumstances they are placed in. Abortion would be more properly confined to such instances as interfere with the normal number of parts, as in stamens, petals, &c., when wanting; and mutilation or degeneration to parts more obviously deformed from their not being developed in the usual manner, as in full flowers, &c., where deformity and departure from the normal mode appear more connected than in the higher developement of a flower from a leaf bud; deformity not being so applicable to a departure from a lower to a higher function as the reverse. This has been always termed monstrosity; and the designation mutilated would not appear so much out of order here at least, though transformation would be a better term for both the ascending and descending series, mutilation being, perhaps, indicative of a still more imperfect form of developement, as in cut or otherwise mutilated leaves, petals, stems, &c. Sometimes the monstrosity of fulness of flower takes another direction, and perfoliate flowers are produced; a branch starts from the flower as in geum, and forms a flower above. This and the full flower are both in the descending series, the nutritive function of growth having overcome the higher function of reproduction. Even in the fascicled appearance of pine leaves it is normal for them to be produced in that way; and, though the circular developement prevails over the longitudinal or vertical, it cannot be so properly called abortion as where accidental deviation from a normal form points out that something is wanting. Abortion or mutilation, at all events, I should think an improper term for a perfectly formed flower.

After these preliminary and introductory remarks, he commences the subject of *General Physiology* in Chap. I. *On the Nature and Causes of Vital Action.* He introduces the subject in the analysis of contents, where he distinguishes between physical phenomena resulting from the physical properties of matter, and vital actions from the vital properties of matter. "These vital properties depend on the peculiar state in which the component particles of the organism, or living being, exist, and this state is induced by an action of organisation upon inorganic matter, by a preexisting structure. This peculiar state is such that spontaneous decomposition has a peculiar tendency to take place, but is kept in check by the renovation characteristic of vital action. Vital action depends on organised structure and a stimulus." It appears, therefore, that he considers life as the result of the state, or formation, of the living being; and that it is continued by the power of a living being to communicate its peculiar state, or form, to inorganic matter, and thus produce its like. We are more accustomed, however, to conceive that there is a separate living power, which is influenced in its actions by previous form. We may conceive that the production or bringing together of matter in a certain form produced life; but it savours more of accident (and not of purpose or wisdom), than to suppose that a separate vital principle was made to act in a general way on matter, besides the particular form which was independent of that principle. The former appears at least more liable to be attributed to accidental congregation of atoms than the latter. Whether life is the result of form, or form the result of life, it may be difficult to decide; perhaps we have no means of deciding; but it is safest to adopt that which is farthest removed from accident.

In Chap. I., he says: "vitality is not a subordinate principle presiding over matter, but a property impressed on the organised structure by its Creator; a property of organised beings, as electricity of inorganic, or as gravitation is of systems. It is more consonant to Divine Wisdom to suppose it impresses laws on matter, than to suppose it to delegate the control of matter to a secondary psychological being. Vitality is a law impressed on form, by which it works, rather than a power deputed to a secondary power. The truth appears to lie between the extremes of those who attribute all the actions of living beings to vitality, and those who maintain that they are purely of a physical nature. Dr. Herschel says that the Divine Creator of the universe has, by creating his materials endowed with certain fixed qualities and powers, impressed them with the *spirit*, not the *letter*, of his law, and made all their subsequent combinations and relations inevitable consequences of this first impression. Our belief of the uniformity of nature proceeds from our conviction of the immutability of the Deity. To suppose that alterations would be required would be to deny the perfection of the divine attributes; while to say that the properties first impressed on matter would of themselves continue its action, would be to deny our dependence on the Creator."

"It is not logically correct to speak of vital properties as superadded to organised matter. Organisation and vital properties are simultaneously communicated to the germ by the structure of its parent. As we have no evidence of the existence of vital properties, unless in organised matter, so we have no reason to suppose that organised matter can retain its regular constitution, and be subjected to its appropriate stimuli, without exhibiting vital actions. Vitality is not a cause of vital action, but the character of the being which exhibits such action. Death is the separation of that bond of union which unites all the functions of the living system. *Molecular* death, or the death of parts, is not always the consequence of the general or *systemic* death. The mere cessation of vital actions, whether apparent or real, does not constitute death. Their suspension may result from the want of stimuli. Seeds may preserve their vitality for a length of time; it is scarcely correct to say here that the seed is alive, since life is synonymous with vital action, but it is possessed of vital properties, or vitality, so long as no destructive change takes place in its organisation."

"In the production of the alimentary materials, of gum, sugar, albumen, gelatine, &c., which are preparations for organisation, and which do not serve for the support of the structure, until united into new combinations (probably after being first decomposed), we perceive the action of physical laws, operating under those peculiar conditions which the living organism alone can perfectly supply. Reasons have already been given for the belief that the affinities which hold together the elements of organised tissues are the same as those that prevail in the inorganic world. We cannot yet succeed in producing artificially any organic compound, even of the simplest kind; but there is no reasonable ground for doubt, that, if the elements could be brought together in their requisite states and proportions, the result would be the same as the natural compound. The agency of vitality does not change the properties, but combines them in modes which we cannot imitate. The operations in vital chemistry are attended, like the changes in the composition of inorganic substances, with a disturbance of electrical equilibrium, and the late researches of Dr. Faraday have fully proved the identity of electrical attraction with chemical affinity. Unless therefore a distinct set of laws could be established, regulating vital affinities, we are scarcely justified in assuming that these laws may not be accordant with those which we recognise elsewhere."

"In the changes denominated *catalytic* by Berzelius, a change is produced by one body upon the composition of another, independent of any alteration or new combination of the first; while, in ordinary chemical combinations, change is effected by the superior attraction of one agent, or of one of its elements, for those of another. The peroxide of hydrogen, which is readily decomposed by any substance having an affinity for oxygen, is decomposed by metals, the fibrin of blood, &c. without any change in themselves; they produce in it a state analogous to fermentation, oxygen escaping, and water being left. Most metals at high temperatures, and platinum minutely divided at low temperatures, produce the union of oxygen and hydrogen in an explosive mixture. The action of sulphuric acid on alcohol, in producing ether, without itself undergoing change, also the conversion of gum or starch into sugar by the same agent, appear referable to the same class. These substances exercise an influence essentially distinct from what is known as chemical affinity. Berzelius defines it as a new power, connected with the electro-chemical."

"The class of actions essentially vital are confined to, and can only occur in, living organised structures; they require properties for their performance which are not to be met with in other substances. Organisation is not confined to the solids alone, for traces of it may be detected in the fluids by which they are nourished. The blood in animals and the latex in vegetables are, in the living state of these fluids, the appropriate stimulus to the assimilating and organising power, which in each tissue converts the nutritious matter into a structure like its own; but the same materials, not themselves endowed with vital properties, would be totally inert. Every tissue possesses vital properties peculiarly its own, besides that common to all, and each property of each organ has stimuli appropriate to itself."

It is impossible in a condensed view to do sufficient justice to so difficult a subject; by those interested in such abstract disquisitions, recourse must be had to the work itself, which will amply repay the trouble. On the same subject DeCandolle remarks, that there are four forces in nature, attraction, affinity, (or chemical force), and also vital and intellectual force. It is difficult, he says, to divine what is chemical and what vital, and to say whether vitality is owing to the form of the organ, or the form of the organs to vitality. Cuvier says form is essential to life. Life is opposed, he says, to chemical affinity, and is a mysterious power, capable of uniting molecules in a way which no other power can. Müller compares life to an idea, or instinct, forming a pattern to which the organism is made to conform, and calls it a principle. The simple germinal disc he regards as the potential whole of the future being. The organised state is the result of the organic creative power, and organic matter. Whether the two have ever been separated is not, he says, an object of science. Schleiden says form is the result of vitality, and not vitality of form. It is not necessary to suppose life a separate psychological being; the term principle does not necessarily imply this supposition. Dr. Carpenter says, it is unphilosophical to suppose that the Creator first gave existence to a vital principle or organic agent, and then set it to work in organising the body, since every organised structure is capable of exhibiting life when the appropriate stimuli are applied, so long as it retains the constitution which causes it to possess those properties. It is unnecessary, however, to set limits as to time to creative power; when the molecules were arranged in proper order, we are told God infused into them the breath of life: this life may have existed before, or may have then been created on purpose, for any thing we know, or are likely ever to know. We may call it a property of organised beings, or a principle; or we may confound the two together, by the manner we talk of them. Life and organisation are so inseparably connected that we can hardly think of them as separate. We know not yet whether attraction is a property or a principle; though, from increasing as the mass increases, it has been called a property, it may be a principle, for aught we can tell, which produces the attractive properties, and may augment as the mass increases, in the same way as galvanism augments by the size of the plates of the battery. We may conceive of life, as a principle similar to electricity, which pervades all organised matter, as electricity does the inorganic; and communicates vital properties to the organism, as the other does magnetism to metals. We may pursue the analogy farther, and say that as metals will not retain the magnetic properties, unless in a certain condition, so neither will the matter of an organism retain vital properties unless in a certain condition or form; and as organised living bodies can communicate their vital properties to others, so will magnetic bodies develope electricity. Vitality may thus be a principle so intimately united with vital properties that it is hardly possible to distinguish them. There is perhaps as much danger to be apprehended in assuming state or form producing vitality, as in vitality producing form; there appears as yet as much logic in the latter supposition as the former. In guarding against mystery we may approach materialism; and though nothing would appear to be farther from the opinions of the author than this, yet such opinions, argued in a different manner, and carried to extremes, might tend thereto.

The peculiar influence of sulphuric acid in changing gum and starch into sugar, without being itself changed, is very striking; it is the same with the conversion of these substances into fibrin by the action of nitric acid and chlorine. They appear a class of actions which approach those of vitality, in so far as that they act on other substances without appearing to be acted on themselves. The researches of chemists have of late been more directed to organised substances than formerly, and the advance is likely to be correspondingly rapid. As new truths come to be discovered, they are found to connect the former, to clear up confusion, and establish simplicity. Many new bases have been discovered, and it is said by Professor Thomson, in his *Vegetable Chemistry*, that we may hope soon to have all bodies reduced to a simple and lucid arrangement of alkalies (or alkaloids) and acids, bases and the bodies which they neutralise. Chemistry has done much to advance physiological knowledge, and more may be expected; the strides in advance in all sciences are so rapid that it is impossible to set limits to expectation, and vital and chemical affinities may be found more closely united than at present is suspected: but we may err in anticipating too much as well as too little; it is part of our nature to err in extremes. Professor Thomson says, organic principles are made by the processes connected with vegetable and animal life. They constitute the results proceeding from the chemical skill of the Creator, which is infinitely greater than ours can pretend to be. The immense mass of information contained in the tables of atomic elements, collected in the *Vegetable Chemistry*, to which great additions are constantly being made, should tend greatly to develope the subject of the relation which bodies bear to each other, and facilitate their classification into those leading groups which furnish a comprehensive idea of the whole.

Vital force does not always seem dependent on the usual stimuli; new bulbs and new tubers will be formed under ground at times, without any foliage being developed to the light, the little stimulus of heat and food being sufficient, without the chemical powers of light, to perform the usual actions and form a new being, though generally smaller, yet perfect.* It seems also, in a certain degree, capable of being stored up, as plants in cold climates push more strongly when growth commences; the longer light of the day, in northern regions, will hardly account for the whole of the effect, and it is usually ascribed to the increased excitability of the tissue. That the usual operations of growth carry with them a powerful stimulus in increasing vital or organic force is clearly seen in the way stunted and slow-growing plants are renovated in vigour. By cutting back the young shoots of last year's growth those of the succeeding year are made to push more strongly; a more vigorous growth is made to commence, and is generally found to continue;

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* Connected with this subject also are the celebrated opinions of Mr. Main, that the germ contains within itself all that will be developed from it in the state of an invisible membrane. De Candolle, in his *Vegetable Physiology*, quotes the opinions of Bonnet, which are similar, and does not state any objection, but rather seems to coincide. Müller says the germ is not *actually*, but only *potentially*, the same being. The germ itself is only formed of amorphous matter; the earliest rudiments, he says, are distinct though simple; and the later complicated state arises by transformation from the simple rudiment. The word invisible, however, seems to set no limits, and it may be said the simple visible rudiments contain the invisible future being. It has been said the opinion is wrong, as the vital sap in the cambium exhibits living powers, and it is this living power that organises, and not a developement of invisible parts. Life, however, may be exerted in developing as well as organising; at least it is possible to conceive so, though not so consonant to the general ideas of life. The aptitude of all vegetable matter to throw off a membrane, on being extravasated or cut, would seem to countenance the idea of invisible membrane, but is generally ascribed to vital force. It has not been explained, as far as we have seen, how this membrane is renewed annually in the cambium, and not a continuation of the same; nor do we see how the transformation of leaves into flowers can be accounted for, if all the organs are originally found in the embryo in a determinate form. To a certain extent the doctrine is true, as parts are found formed long before they are developed. In the *Library of Useful Knowledge*, it is said the rudiments of the flower have been discovered in the bud seven years before flowering. In hybridising grey peas with white, Mr. Knight observed the transformation only to be partial the first year, and fully developed the next; indeed hybridisation of any kind seems to be against the doctrine. Undoubtedly, at least, it vitiates that part of it which has been carried so far as to attribute the formation of all the plants of a species to exist in the primary germ. We are apt to lose ourselves, however, when we attempt to talk of invisible things.

so that cut over plants are found in a few years to outstrip those left uncut in an immense degree, and very soon to double their bulk. Besides the vital force there is instinct, which Cuvier likens to a constant dream of the imagination, and Müller thinks connected with life by the idea or imagination, which furnishes to vitality the picture of the structure to be formed. Imagination or instinct, as we ascend in the class of animals, is found connected with reason, where it has been disputed that such exists. In their deviation from their usual instinctive manner of performing their actions, in the dreaming of dogs, &c., we perceive the approach to reason, which in man reaches the highest grade we are conversant with. That the imagination is distinct from the reason, however, we perceive, when we feel our imagination acted on in a way we cannot account for, unless by psychological agency. Pictures are presented to the imagination which we had never before seen, of any train of ideas leading to which we have no conception, and which we are constrained to impute to psychological agency. We are thus led from matter to mind, and from mind to spirit; from nature up to nature's God.

(*To be continued.*)

Art. II. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the Conductor.

(*Continued from* p. 164.)

III. The Working and Management of Cemeteries.

By the *working and management of cemeteries* are to be understood the rules and regulations respecting interments, monuments, planting, &c., the fees to be taken, and the books to be kept by the clerk or sexton. Previously to the establishment of large cemeteries there were scarcely any rules or regulations for the guidance of the sexton, and hence the irregularities that were continually occurring in burying-grounds: such as graves opened in some parts of the ground in which interments had recently been made, in order to gratify the wishes of the deceased, who had, perhaps, fixed on a particular spot; while other parts of the grounds were comparatively without graves. Had there been an established rule, that no ground in which an interment had been made should be opened so long as there was any fresh ground to bury in, such anomalies could never have taken place, and there never could have occurred what is now frequently to be met with, viz. ground untouched in one corner of a churchyard, and a charnel or bone house at the other. In every particular case there will probably be required some rules and regulations peculiar to the locality, and some which are everywhere applicable. We shall only enumerate such rules and regulations as we think ought to be general.

The most important rules respecting a place of burial must necessarily be those which have reference to the sacredness of the place, the security from disturbance of the bodies of the dead, the healthfulness of the living, and their improvement in sentiment and in morals. On these principles we would found the following rules, which should be absolute, even in cemeteries and churchyards as they are at present constituted. Some of these rules have been mentioned before, but we repeat them, in order that they may be strongly impressed on the mind of the reader.

First, We would allow no grave to be dug, except in ground which never had been opened before. When a grave in which an interment has taken place at the usual depth of 6 ft. is opened, one of two things must happen; either the bones at the bottom of the grave must be disturbed, or, to avoid this, the grave must not be dug to a sufficient depth. There may be three exceptions to this case, if the superintendent of the burying-ground could be depended on: first, when the previous interment has taken place to a greater depth than 6 ft., which would be ascertainable if a proper register had been kept; second, where the surface of the burying-ground was to be raised by the addition of a foot or two of earth all over it; or third, when a child was to be interred, 4 or 5 feet, according to the age, &c., of the child, being sufficient in the latter case. Every grave whatever should have a number cut in a number-stone, or on some part of the plinth of the gravestone or monument, if there be one, for the purpose of registration.

Secondly, We would allow no coffin to be placed nearer the surface of the ground than 6 ft. A German author has shown by calculation the different degrees of depth at which interments may take place, according to the age and other circumstances of the subject. His depth for adults is 6 ft., and for children under a year, 2 ft. The calculation may be useful in Germany, where, in many churchyards, the children are buried in a part of the ground by themselves, and their graves arranged according to the children's ages and lengths; but, in England, the safer mode is to make the rule of having the grave 6 ft. in depth absolute, for it must be recollected that, in the case of children above three years of age, the bones, practically speaking, are almost as indestructible as those of adults. Hence we conclude that a child's grave ought no more to be opened for a second interment than that of a grown up person.

Thirdly, When more interments than one are to take place in a grave of the width calculated for one coffin, we would require a stratum of earth over each coffin of 6 ft. in depth; and supposing one interment made in the bottom of a grave 12 ft., 20 ft., or 30 ft. deep, and 6 ft. of soil placed over the coffin, then on the surface of that soil we would deposit a coffin-shaped slate or flag-stone, as a preventive to the grave-digger from going deeper when he was excavating for a second interment. The protecting stone ought to be taken up when the second interment was made, and used after every interment till the last, when it might either be taken out for use in another deep grave, or, if it were a family grave, it might be left immediately over the coffin for protection of the bones, on the principle mentioned in p. 98. This rule will not prevent the interment of ten or twelve bodies in a grave as at present, but it will require such graves to be an immense deal deeper, viz. at the rate of 6 ft. for every interment; but there is no reason why graves should not be dug as deep as wells. A grave 18 ft. deep, however, will take three interments, which, at the low rate of 10*s*. each, as in the Abney Park Cemetery, will give a return of 5,445*l*. per acre; and in cemeteries where 25*s*. for each interment is charged, of above 13,600*l*. per acre.

Fourthly, When a common or private earth grave was once filled to within 6 ft. of the surface, it should on no account whatever be opened at however distant a period.

Fifthly, Brick graves which are filled with earth after each interment, we would make subject to exactly the same laws as deep earth graves: that is, we would have a stratum of soil 6 ft. in thickness over each coffin. We would allow no interments to take place in brick graves, in which each coffin was not either covered with 6 ft. of soil, or with a flag-stone hermetically sealed. Where the system of hermetically sealing was proposed to be adopted, we would require the walls of the graves to be built with Roman cement, every coffin to be separated by a flag-stone resting on ledges projecting from the walls, the joints of this flag-stone to be made good with cement, and a coating of cement of not less than 3 in. in thickness placed over the entire stone. Or, as a substitute for the use of flag-stones, we would surround and cover every coffin with a mass of Roman cement, so that it should be completely embedded and enveloped in that material. By this hermetically sealing mode of interment, a great many bodies might be got into one grave; but it is evidently too expensive for general purposes: for large families it may be the cheapest mode, consistent with safety to the living; but, as there is always the possibility of desecration at some future period, for our own feelings we should greatly prefer lateral (side by side) interments in the free soil.

Sixthly, We would allow of few or no catacombs or vaults in buildings, and certainly of none in or under churches, or other places where assemblies of human beings were held; but, as many catacombs and vaults have been built in the public cemeteries, in the case of all interments in them, the catacomb or vault should be hermetically sealed the same day on which the interment took place, and should on no account whatever be again opened. Nothing can be more dangerous with reference to the health of the living, than the mode prevalent in the new cemeteries, of merely placing an open grating in front of the coffins deposited in catacombs. Were it not for the current of air established through the vaults, by which the mephitic gas is carried off as fast as it is produced, it would be impossible for a living person to exist for an hour in these cellars for the dead. But even if these catacombs were each, when a coffin is placed in it, hermetically sealed in front, there is scarcely one of them so carefully constructed as to be air-tight, so that the mephitic gas is certain to escape from some part of the catacomb, more especially when we consider the expansive power of air when compressed. And for what is all this disgusting boxing up of dead bodies, as if to bid defiance to the law of nature? We cannot think it in good taste to practise this mode of sepulture, and therefore we would render it expensive by such a heavy tax as should serve for the interment of the poor in a more careful manner, for the general ornament of the cemetery, or for government purposes generally. Nor do we think it could be considered oppressive to pass a law obliging all bodies now in vaults or catacombs under churches, chapels, &c., to be taken out and buried in the free soil.

Seventhly, We would encourage the erection of handsome monuments, and the inscription on them of moral sentiments, the former to improve the taste, and the latter to cultivate the heart and affections. In both we would allow individual taste to be displayed; but at the same time we would encourage individuals to submit their designs to men of acknowledged skill, and to listen to their hints for improvement.

Eighthly, We would at all times keep every part of the cemetery in the highest order. The grass should be kept short and smooth by frequent mowing; the gravel free from weeds and smooth by frequent weeding and rolling; the edges, which we would form of concealed bricks or tiles (*figs.* 56. and 57.), low, and constantly clipped; and the leaves, as they drop from the trees, should be picked up the same day on which they fell; litter of every kind picked up the moment it appeared; and the walls, chapel, lodge, gates, drains, &c., kept in constant repair.

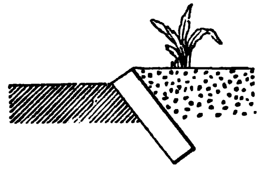

Fig. 56. *Concealed Brick Edging.*

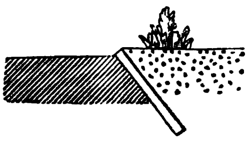

Fig. 57. *Concealed Tile Edging.*

Ninthly, To insure the high keeping of monuments of every kind, whoever erected one should, at the time it was put up, pay to the proprietors or directors of the cemetery a sum considered sufficient to preserve it in repair in perpetuity, or for a certain number of years.* Every person having shrubs or flowers planted on a grave, we would require to pay a sum sufficient to keep them trimmed for such a number of years as they might think fit; or to keep them in order themselves, under the penalty of having them rooted up and grass substituted, if neglected for a period varying according to the kind of plants. Flowers and roses require to be attended to weekly during summer, but evergreen shrubs may grow for years with scarcely any attendance. As flowers and low shrubs are very apt to get tawdry when neglected, as soon as keeping them in order ceased to be paid for, or otherwise effected, the plants should be taken up and grass substituted. The turf mounds over graves, and the number-stones (of which, as already observed, there ought to be one to every grave, whether it have a monument or not), ought, of course, to be kept in order by the proprietors of the cemetery.

Tenthly, No dogs or improper persons; no smoking, drinking, or even eating; no running or jumping, laughing, whistling, or singing, or other practice that might indicate a want of reverence for the place, should be permitted. No person should be allowed to walk on the graves, or to cross from one walk or green path to another in places where the ground was filled with graves.

Eleventhly, Wherever there was the least risk of a grave being reopened for a second interment, or for any other purpose, or even where it was desired to protect the bones in the case of some future unforeseen change taking place, such as making a road through the cemetery or building on it, we would introduce a guard or follower of stone over the last-interred coffin, as already described, p. 98. and p. 216.

If the foregoing rules were rigidly attended to, cemeteries, whether in town or country, would be as healthy as gardens or pleasure-grounds, and would form the most interesting of all places for contemplative recreation. As one great object in forming and managing a cemetery, whether small or large, is to render it inviting by being ornamental and highly kept, it is not desirable that all the monuments should be crowded together in one place, and all the graves without monuments placed in another part of the ground. It appears better that the monuments should be seen one after another, with plain spaces intervening; and for this reason it ought to be a rule that any person purchasing a grave may choose the spot where he will have it, provided he makes known whether he intends to erect any monument and what sort. This rule, however, must be taken in connexion with another, viz. that it is desirable to have a considerable display of monuments on the borders laid out on purpose for them along the roads and main walks, and along the boundary wall. The finest ancient monuments in the churchyards of Scotland, and we know nothing to equal them in England out of Westminster Abbey, are the sepulchral structures projected from the walls of Grey Friars churchyard in Edinburgh, and the Cathedral burying-ground at Glasgow. These in general are not vaults, catacombs, or brick graves, but interments in the free soil, where the husband and wife lie side by side, and the space is enclosed by highly wrought iron railings, and superb architectural and sculptural compositions fixed against the wall. Sometimes the whole is covered by an architectural canopy, supported on stone columns. The architecture is of the time of the Jameses, elaborate in composition, rich in decoration, and learned, scriptural, heraldic, or quaint, in inscription; and there is nothing offensive in the mode of inhumation. In our opinion, it is in far better taste for a family to expend money in purchasing as much ground in the open part of a cemetery as will allow the husband and wife, and some of their children, if they have any, making an allowance for a certain number of both sexes to die young, and of the females to die unmarried, to be buried side by side, than to expend it on burying in vaults or catacombs, or even on expensive monuments. In the cemeteries about London we frequently see monuments that have cost upwards of a hundred pounds placed over what are called family brick graves, in which, perhaps, have been deposited one over the other, without intervening soil or flag-stones hermetically sealed, the half dozen bodies constituting the family, so as to form a mass of putrefaction appalling to contemplate; more especially as contrasted with the chaste marble sarcophagus or other monument placed over it. Such a disgusting mode of interment, to which men have been driven by various causes, which have led to charges so high that they cannot be borne, is not for a moment to be compared with the interment of a family side by side in the free soil. There is nothing at all offensive in the latter mode; nothing to hinder such interments from taking place in a shrubbery or pleasure-ground, or a flower-garden. If the citizens of London were to reflect on this, instead of laying out a large sum on a brick grave or a vault, and afterwards on a monument to be placed over it, they would lay it out in purchasing a greater extent of territorial surface, and in enclosing this surface in such a manner as to mark it for their own. The family name, deeply cut on the stone forming the coping or finish of the enclosing barrier, would say more for the taste of the owner, than a thousand pounds laid out on a monument over a vault or brick grave. The most desirable part of a cemetery for small grave enclosures of this kind is against the boundary wall, as at Grey Friars in Edinburgh, the Glasgow Cathedral, and the old burying-ground at Munich; but it is singular that, in almost all the new London cemeteries, this very desirable situation for graves and monuments is occupied by a belt of trees, as if the cemetery were to be laid out exactly on the same plan as Brown's parks, with their surrounding belts and interspersed clumps.

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* The sum per annum, and the number of years during which the party wishes the monument, gravestone, shrubs, or flowers, kept in order, being agreed on, it is only necessary to find, by the annuity tables (say, *Inwood's*, 12mo, *5s.*), the present value of this sum, at the rate of interest obtainable in the public funds. The sum required for keeping a monument in repair, even in perpetuity, is by no means so great as might be expected. The ordinary charge for keeping a common grave and gravestone in repair is only 1*s.* a year, and the present value of an annuity of that amount, payable for ever, reckoning the interest of money at 2½ per cent, is 2*l.* Hence, 5*l.* paid down would give 2*s.* 6*d.* a year for ever, which is quite enough for most monuments.

If men of landed property, however small its extent, were to reflect on this subject, we are persuaded they would greatly prefer laying their bones in a suitable spot in their own grounds, to having them piled up in any family grave, vault, or catacomb whatever.

It ought to be a general rule to place handsome monuments at particular points of view; such as at angles formed by the junction or intersection of roads or walks, terminations to straight walks, points seen from the entrances and from the chapel, &c.

One of the most important rules respecting monuments is, that they be all placed on solid foundations of masonry reaching as deep as the bottom of the grave, by the means already described (p. 157.), or by other equally efficient means. A rectangular tomb over a brick grave will, of course, rest on the side walls of the grave; but over a common earth grave it will require to be supported, either by four pillars carried up from the bottom of the grave, or by two pillars at each end, founded 2 or 3 feet deep in the soil, and 2 or 3 feet distant from the edge of the grave. In this way rectangular tombs, or any description of large monument, may be placed over earth graves of any depth whatever, and in cases where it would be practically impossible to carry up pillars from the bottom of the grave.

It is never desirable to form two graves adjoining each other at the same time, or even after a shorter period than two or three years; because the narrow partition of firm soil between them is apt to give way. However, if there is any particular reason for graves being so formed, such as a wife desiring to be buried by the side of her husband, &c., the weak side of the grave can be supported by grave-boards.

The most economical mode of using the ground in any cemetery would be to begin at one end or side, mark out the graves, and use only every alternate one; then, when the ground was once gone over, to go over it a second time, and occupy all the blank graves. As, however, it has long been customary for persons purchasing graves to have the liberty of choice, the most economical mode cannot often be adopted. When the interments are to commence at one end of the cemetery, and the whole of the ground is to be occupied as they proceed, that end ought always to be the lowest; because, when the interments have commenced at the highest point and been carried down the slope, considerable inconvenience has been found from the fluid putrescent matter following the inclination of the ground. (See Picton in *Arch. Mag.* vol. iv. p. 431.)

No part of a cemetery ought to be exclusively devoted to common graves, because, as a number of coffins are placed in each grave, there would in this part of the cemetery be accumulated such a mass of putrescent matter as would contaminate the air of the whole, and render the locality insalubrious for very many years.

With a view to preventing waste of ground, the proprietors, or director, or curator of the cemetery ought to place common graves either where private graves are least likely to be taken, or where a private grave with a monument might interfere with a grave already existing. Hence it may frequently be desirable to place a common grave, or any private grave to which there is a certainty of no monument being erected, on each side of a grave with a conspicuous monument. Even two or three intervening common graves may sometimes be desirable among monuments, in order that each structure may have its full effect on the spectator while approaching it, as well as while directly opposite to it.

The mound over a common grave, while it is liable to be reopened, should not be finished with turf or flowers; because, to open a grave with the finished character thereby given is more shocking to the feelings than to open an unfinished grave.

Every grave, whether private or common, to which there is to be no monumental stone, should still be finished with a green mound, which itself is a kind of monument, and maintains respect for the spot so long as it remains.

Though levelling the surface of ground filled with graves having no stone monuments, instead of finishing the grave with a raised grass mound, renders the grass much easier mown, yet, as it confounds all distinction between ground filled with graves and ground not so filled, we would not on any account follow this practice. The Society of Friends and the Moravians adopt this mode, and we admit the superior neatness of their grounds on this account; but we disapprove of it, more especially in the case of the Quakers (who forbid even flat stones with inscriptions, which the Moravians admit), because it exhibits nothing characteristic of a place of interment. As it destroys the distinctive feature of a grave-yard, it cannot be considered in just taste, and ought, therefore, as we think, not to be adopted. Technically, the appearance of the turf mound over the grave is the expression of purpose or use, and this expression is essential to every work of art.

In all large cemeteries there ought to be some graves of every kind, ready made and fit for being occupied at the shortest notice. To protect these graves from the rain or snow, the grave-cover described p. 163. should be placed over them.

In order to effect the *registration of graves and interments*, which we have stated to be an important part of the working of a cemetery, it is necessary to recur to the mode of numbering the graves described in a former page. This may either be done by the mode of squares common in large cemeteries as at present laid out, and exhibited in *fig.* 19. in p. 144.; or, in small cemeteries or churchyards, by laying out the ground in broad borders along the walks and walls, and in double beds, calculating the capacity of both beds and borders in single graves, and having a number-stone at each end of the bed or border indicating the number of single graves it will contain, and the direction in which the numbers are counted, as shown in *fig.* 35. in p. 158.; in which the stone at *a* contains Nos. 1. and 50., being the first and last graves on the bed; and the stone *b* contains No. 25., being the last number on one side, and No. 26., being the first number on the other side. The next bed will commence with No. 51., and so on throughout the cemetery. This mode of numbering requires that every grave or piece of ground purchased, which is to be larger than the space allowed for a common grave, must be a multiple of that space: thus, a vault of the smallest size requires the space of one grave for the stair and another for the vault; and hence it would be recorded in the cemetery books under two numbers. A vault of double or treble the size would require the space of four or six single graves, and thus absorb four or six numbers, and so on. This is the mode which we have adopted in the Cambridge Cemetery (in which, in conformity with existing prejudices, we made provision for constructing vaults and catacombs, if they should be required), because it is of small size; but in one on a large scale we would first lay out every part of the cemetery in beds and borders, and next have one number for each bed and border. The interments in each bed or border should be numbered in the order in which they are made; and in the register the numbers of the bed or border, and the number of the interment, would be found together. We have already (p. 145.) given our reasons for considering this a better mode of laying out a cemetery than the one generally adopted, of throwing it into squares.

This mode of throwing the ground into squares is at present adopted in most cemeteries, more especially where, from the numerous turnings of the winding walks, the ground is laid out in very irregular shapes. In the working of such cemeteries the practice is to number every grave or vault in the order in which it is made, and indicate its place in the cemetery by a reference to the square in which it is situated, and by laying it down in the plan of that square in the cemetery Map Book in the manner hereafter described.

As the interments require to be numbered, to indicate the order in which they are made, as well as to indicate their place in the cemetery, it follows that every grave has two numbers; the one indicating the precise spot in the cemetery in which the grave is to be found, and the other the time or times at which bodies have been deposited in it; because family graves, while they have only one number referring to their locality, have several referring to the interments made in them. By having an index to the interment numbers, and another to the numbers of the graves, and both referring to the Register Book, the particulars may be obtained of every funeral that has taken place in the cemetery from its opening to the time being.

The *cemetery books* which require to be kept are as follows: —

1. An *Order Book*, in which are entered the date, name, description, age, and abode of the deceased, mode and time of the intended burial, size of the coffin, name of the person by whom the order is given, and the charges. These and some other particulars are printed on two columns of a folio page; and, the blanks of both columns being filled up, one column is retained, and the other is cut out and sent to the sexton. A receipt for the money, indicating the leading particulars, is at the same time given to the undertaker.

2. A *Register Book*, which is filled up after the funeral has taken place, and contains columns extending across two folio pages, for the following particulars: — number of the interment; number of the grave; name and description of the deceased; last residence; disease of which he died; age, date, and hour of burial; in what part of the cemetery; what monumental distinction; purchased by whom and under what date; sum paid for the interment; sum paid for keeping the gravestone, monument, or plants, &c., in

order; time during which they are to be kept in order for the sum paid; name of the undertaker; name of the clergyman who performed the ceremony; name of the sexton. — All these particulars are entered in the order in which they are here enumerated.

3. A *Ledger*, in which an account is opened for each grave in the following manner: two folio pages contain the same number of columns, and the same headings as in the Register, but the body of the pages is divided into spaces, one of which is allotted for each number of a grave, in the same manner as the pages of a ledger are divided into spaces for each name or account, which has been opened; and in this space, which exhibits the transactions which take place with the grave it represents, is inserted the number of each of the different funerals that have taken place in it. For example, a brick grave, 60 ft. deep, may have ten different interments of as many different numbers, dates, and names, of the deceased; and hence a space at least equal to ten lines will be left for it. A private grave, 36 ft. deep, which will only contain six coffins, requires only six lines; a vault of twenty catacombs a proportionate space; and a single catacomb in a public vault only one line. The utility of such a ledger, in the case of extensive cemeteries, is exemplified in the case of that of Kensal Green, as any one may be convinced of by applying at the office, 95. Great Russell Street, London.

4. *A Map Book.* — In the cemetery office there ought to be one map showing the entire cemetery, with all the roads, walks, squares, beds, &c., and even the trees and shrubs, correctly laid down. Then there ought to be a book in which every square or bed is laid down on a sufficiently large scale to admit of inserting in it the plan of each particular grave. The scale for these separate squares in the Kensal Green Cemetery book is 2 in. to 6 ft., and in the Tower Hamlets Cemetery 3 in. to 8 ft. In small cemeteries laid out in beds, like the Cambridge Cemetery, such a map book may be dispensed with; but where the imaginary square system of laying out is adopted it is essential.

5. Some subordinate books are convenient for abridging labour, and insuring accuracy, such as printed forms for certificates of registry, for permission within a certain time to place a head-stone or other monument, for receipts for cash or fees, &c. The books for the Kensal Green Cemetery were prepared by Messrs. C. and E. Layton, Stationers, 150. Fleet Street; those of the East London Cemetery by Mr. T. H. Hoppe, 79. Strand; and those of the Tower Hamlets Cemetery, the last London cemetery which has been formed, by Mr. E. Colyer, 17. Fenchurch Street. The common business accounts which require to be kept, of course, do not differ from those in use in general business.

We have omitted to notice some minor details required for the working of a cemetery, but they are such as will readily occur in practice; and they may be foreseen by procuring a printed paper of the rules and regulations of any of the principal London cemeteries, or of the burying-grounds belonging to the Incorporated Trades of Calton, Edinburgh. The latter, which have been kindly forwarded to us by Mr. Hay, the recorder and superintendant, are remarkable for their comprehensiveness and efficiency.

The curator of a cemetery ought to be a man of intelligence, and of cultivated feelings, with a taste for and some knowledge of gardening; for all which reasons we think the situation one well adapted for a middle-aged gardener.

(*To be continued.*)

ART. III. *On the Exhibitions of the London Horticultural Society, and on various Matters connected with Horticultural Exhibitions.* By AMICUS.

THE subject I am about to introduce may be thought, by some, unfit for such a publication as the *Gardener's Magazine;* but, as it is chiefly for the benefit of gardeners that I have written it, perhaps you will allow me a page or two for its insertion.

It is, doubtless, fresh in your memory, that, some time ago, a bill was passed for the better observance of the Sabbath, to the great benefit of many of Her Majesty's subjects; but, as far as I have experienced, it has not effected much good for gentlemen's gardeners. My object, therefore, is to induce you to use your influence, in the proper quarter, on their behalf; and endeavour to secure for them, and some others, the better observance of Saturday. I allude to the exhibitions at the gardens of the Horticultural Society, which are so frequently held on that day. How far it may affect the officers of the Society I cannot pretend to know, but I am certain it is very inconvenient for those persons who have to come from ten to twenty miles with their productions ; and to conscientious persons, who take the word of God for their guide, it is a matter of doubt whether they ought to send plants, &c., to exhibit, or sanction by their presence an exhibition which is calculated to tempt so many hundreds of persons to transgress the command, " Remember the Sabbath-day, to keep it holy." And I have reason to believe that there are many who would come, but do not on this account. Those gardeners who live at the distance I have mentioned must leave home by the middle of Friday night: supposing them to get clear off from Chiswick by seven o'clock on Saturday evening, they will not reach home before twelve or one o'clock; and, if they have many things to unpack, they must encroach very much upon the Sabbath before they have done ; and then, let me ask you, what state of body or mind do you think they will be in, after the fatigue and excitement of the past day and night, to attend to meditation at home, or the duties of the sanctuary abroad? How far the Society can justify themselves in respect to this arrangement I cannot imagine; but they ought to have some weighty reasons for inducing men to run the risk of losing their souls, when He who " spake as never man spake" has asked, " What shall it profit a man, if he gain the whole world and lose his own soul?" But the evil does not terminate here. I believe it extends further than any one can tell. Only think of the number of vehicles that are called into action on that day, both public and private, many of which would undoubtedly have otherwise remained clean till Monday, instead of making Sabbath-breakers of the various servants who look after them. There is also another class of persons who suffer in the same way, viz., those whose houses are open for the accommodation of the public. Instead of their houses presenting the same appearance as on other Saturdays, they are all in confusion till late at night, when the inmates are so fatigued with extra labour, that they are compelled to leave much undone till Sunday morning, when, being free from customers, they have an opportunity to put all right again.

It is also very injurious to those who are compelled to go to such houses for refreshment. The gardener, if so inclined, may perhaps find something to fill up the spare time he may have, without spending it there; but not so the men who accompany the carriages which convey the plants, many of whom would gladly go somewhere else if they could ; but, having no other amusement to make choice of, they remain there till the exhibition is over, by which time they have become so stupefied with liquor, and the want of rest the previous night, that they are much more fit to go to bed than to travel six hours, and prepare for the Sabbath. But, besides those who are obliged to suffer, there are many more who suffer voluntarily ; I mean such as spend their time in the public-house merely from curiosity and fondness of company, and in this class we may include a great part of their customers ; and these, not being obliged to leave so soon as the others, are perhaps in a worse state than those before mentioned to prepare for the duties of the coming day. A vast deal more might be said of the evils which result from exhibiting on Saturdays, but I trust enough has been said to cause those whose duty it is to make the arrangements to give it the attention it demands, and that 1843 will be the last year it will be witnessed. I do not see why Wednesday might not be fixed on for all, as well as only one, of the exhibitions; except it is that Saturday is a favourite day with many for giving and attending parties, who, at the same time, are subscribing their money and using their influence for the suppression of vice, and the establishment of Sabbath and other schools; while at home they expect their servants to attend divine service, though themselves are the cause of such servants being absent. Surely such things ought not so to be.

As far as the spiritual improvement of gardeners is concerned, perhaps you will allow me to make another observation, which is, that they should have every possible inducement to Sabbath-keeping, instead of being encouraged to Sabbath-breaking. Here I allude to gardening publications, which, I think, would be much better to be published on Tuesday instead of Saturday, Sunday, or Monday. Surely gardeners, or under-gardeners, are not so highly paid as to be able to purchase more of such works than their evenings would allow them to read; or, if some of them are, it were well if they would spend what they cannot save on something that would be more proper for Sabbath reading. Gardeners are, in general, fond of study. The retired situations in which they practise, perhaps, makes them so. The things under their care require, in many instances, attention on Sundays, as necessarily as the ox requires food or water; still there are many intervals in the day which may be, and usually are, filled up with reading.

To a mind unacquainted with spiritual things, nothing is more likely to attract attention than a publication which treats on those subjects a knowledge of which it is so anxious to obtain; thus imperceptibly drawing it away from the pursuit after that knowledge which makes " wise unto salvation." If, therefore, such publications came out on Tuesday, there are not many in this country but might obtain them in time to read them before Sunday, and have their minds at rest for attention to those things which that sacred.day requires. And here I would just notice what an amount of good might be done, if employers would take care that their garden cottages, and, indeed, all cottages on their estates, were furnished with a few religious, and at the same time entertaining, books, for the improvement of those who are dependent on them. This might be done at a very small expense, and would yield an abundant return in the good they would accomplish. I have no doubt that some will ridicule the attempt I have made to effect the alterations I have mentioned: but, while societies are forming on every side for the spiritual benefit of mankind, I do not see why something should not be done for a class of men who are, in many instances, placed almost as much out of the reach of spiritual instruction as the heathen themselves; and, above all, why the Horticultural Society of London, which in every other respect is calculated to do so much good, should be the means of thwarting the endeavours of wise and good men, when it might so easily further them. Whatever ridicule, therefore, may be heaped on me, I am prepared to meet it; being confident that I shall have the commendation of all whose approbation is worth having, and also the satisfaction of knowing that I have done what I could.

Middlesex, Jan. 1843.

Art. IV. *Notes taken during a Twelve Days' Tour in Brittany and Normandy, in July,* 1842. By T. Rivers, Jun.

Dinan. — After a most interesting voyage from St. Malo, per steamer, up the Rance*, about twenty miles, we arrived here, and were much delighted with the situation of the town: its boulevards command a most extensive view of the surrounding country, which is beautifully undulated, well wooded, and apparently remarkably fertile. On the walls of the tower of St. Vincent, now used as a prison, we gathered seeds of a beautiful species of Diánthus; every crevice in the upper part of the walls was brilliant with the gay pink and white flowers of this very pretty plant. I have not yet been able to identify the species. The wallflower, strawberry spinach, and a species of *S*èdum, were also most abundant. Our attempts to gather specimens of these plants, by mounting on each other's shoulders (two of us being six-feet men), attracted the notice of the prisoners confined in the tower, and caused some merriment amongst them. The promenaders on the boulevards, which pass under the walls, seemed also surprised at our earnest endeavours to gather objects to them of such little interest. The boulevards are planted with elms of some seven or eight years' growth; these seemed all seedlings of the Cornish elm, and were exceedingly interesting in their variations of habit. My attention was drawn to them, more especially as I had never before seen seedlings of this variety of elm, which, I believe, never bears seed in England. Many of the varieties were exceedingly beautiful; and I quite regretted not being able to take home some grafts. The gardens on the south side of the town overlook the boulevards from a height of 30 or 40 feet: they were apparently on the site of the old walls of the town, of which the boulevards on this side formed the fosse. Their situation appeared delightful; they were thickly planted with Robín*ia* inérmis (umbraculífera), and laid out in the usual French style. Dinan is the most famous horse market in Brittany. The horses were all a sort of short-legged galloway, about fourteen hands high; some of them showing marks of good blood, and all in fine condition. They were what we should call in England "useful animals." The dealers were Bas Bretons, with hardy swarthy countenances, and wearing black beaver hats with immense brims. Their swarthy countenances, and their driving their bargains in pistoles, almost inclined us to think they were of Spanish origin. Their clamouring in making a bargain, and their hard manner of striking each other's hands many times consecutively, before the peculiar concluding slap, were highly amusing. They demanded for some very nice four and five years' old horses twenty and twenty-four pistoles. On enquiry, we found the pistole reckoned at ten francs, so that a very good horse might have been bought for eight pounds: something superior for ten pounds. I must give these rough dealers the credit of not demanding even of me, an Englishman and a stranger, more than the regular price. We found the wheat here, July 21., "dead ripe." I observed a curious red-bearded wheat, which I had never seen elsewhere; but, in general, the wheat was of very inferior varieties, ears thinly set, and straw very slender.

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* Do we derive the name of our esteemed pear from this locality, or from a small town or village near Metz of that name?

We visited "the Fountain," a delightful resort, about a mile from the town, situated in a deep valley, almost a ravine. It is a spring, whether chalybeate or not I was unable to ascertain, to which the pleasure-seekers, who visit Dinan in great numbers from Jersey and Guernsey, resort in the morning to drink the water. The descent to it from the town is exceedingly abrupt; the walks near the bottom turn almost at right angles, but, as they are bounded by hedges, one can walk with safety. In warm weather this is a most agreeable place.

Rennes, July 23.—This town, the capital of Brittany, is one of the most regularly built cities in France. We found the botanic garden a pleasant promenade, but the collection of plants exceedingly meagre. A fine specimen of the *Laúrus Sássafras* was the only object of any interest: this measured 3 ft. in girt at 6 ft. from the ground. It was Saturday, and market day: we were surprised at the immense concourse of country people. Provisions were cheap and abundant: fowls 1*s.* 1*d.* each, ducks 1*s.* 3*d.* each; butter 6½*d.* per pound; some fine plums, called "La Madeleine," and blue perdrigon plums, the latter from walls, attracted our notice. We were surprised, at this early season, to find filberts nearly ripe, and abundance of mulberries. Vegetables, in general, were small, and very inferior to those exhibited in the markets of London. The butcher's broom (*Rúscus* aculeàtus) was used here extensively to brush off flies in the butcher's market. We were pleased with the breed of cattle: the cows, in particular, appeared so exceedingly docile, they all bore a strong resemblance to the most esteemed Alderney cows; this extends nearly throughout Brittany. The breed of pigs seemed to us perfectly ludicrous: some yearling store pigs, for which they demanded twenty-four francs each, were so long-legged, that, on observing a person scattering some peas on the ground for them to eat, we felt exceedingly curious to ascertain in what manner they could possibly get at them. Much to our relief, these "daddy long-legs" knelt down and ate their peas most reverentially. I questioned the farmers respecting their predilection for thin bodies and long legs, when they might so easily import our short-legged fat-carcassed pigs: "Ah, well, Monsieur, I don't like your fat; it is only fit for savages." He spoke the sentiments of his countrymen: a Frenchman hates fat—and silence.

We were much interested with the agreeable "Promenade du Tabor," adjoining the Jardin des Plantes, which commands interesting views of the surrounding country; numerous seats are placed under the shade of the trees, so that it forms, in hot weather, a most agreeable place of resort.

We visited the nursery of the Messieurs Lansezeur, and found the usual stock of a respectable French nursery, viz. oranges in pots, pomegranates, and other showy greenhouse plants, with rather a large stock of standard roses; but no new plants, either species or varieties, of any interest: but I ought to except a moss rose obtained here from seed, and named "Lansezeur."

Nantes, July 24. — After a dreary ride of twelve hours from Rennes, partly through the "Landes" of Brittany, consisting of a sterile flat surface, with occasional detached masses of furze and heath, we arrived at this beautiful city. I observed in the hedge-rows, as we approached Nantes, the Quércus *Taúzin* mixed rather abundantly with the common oak. We were struck with the massive magnificence of the houses here: whole streets consisted of houses from six to eight stories in height, all of which were built of stone. I was reminded of St. Germain-en-Laye, which has something of the same character. Our first visit was to the quays on the banks of the "beautiful Loire," which seem much resorted to by promenaders; and most beautiful they are. Our next was to the Jardin des Plantes, with which we were highly interested; not so much by its collection of plants, which was mediocre, as by its fine specimens of Magnòl*ia* grandiflòra. We here saw what is generally considered the first plant of this species imported into Europe. This tree [the history of which is given in the *Arboretum Britannicum*, vol. i. p. 263.] appeared about 30 ft. in height, and was 3 ft. in girt at 6 ft. from the ground. The avenue of Magnòl*ia* grandiflòra (Exmouth variety) consists of twenty-four plants on each side of a long walk, planted about 20 ft. apart; these were coming into full bloom; they have compact round heads. I calculated they were about 20 ft. in height; their girt, at 6 ft. from the ground, was 24 in. A fine specimen of *T*ília álba péndula, 30 ft. in height, with its numerous shoots in curious fascicles, attracted much of our notice; its branches were not strictly pendulous, but rather horizontal, and its appearance highly picturesque and elegant. Chionánthus virgínicus, grafted on the ash, had leaves quite double their ordinary size; in fact, some of these were more than 12 in. in length. A fine tree of *Sophòra* japónica péndula, grafted on a straight stem, perhaps 20 ft. in height, formed a regular and beautiful column of foliage; its shoots descending perpendicularly nearly to the ground. I could scarcely leave this tree, so much did I admire it. Some immense trees of Robín*ia* inérmis were also remarkable. A standard Althæa frutex, in full bloom, gave indications of the warmth of this fine climate. Grapes trained on espalier rails, and approaching to maturity, excited in me, I must confess, some little feeling of envy.

As part of our dessert at the table d'hote to-day, we had ripe green gage plums, ripe figs, and fine jargonelle pears. One dish is perhaps worthy a little notice for its peculiarity, and for showing in strong colours the difference in taste between us and our neighbours. I observed on the table what I thought to be a preparation of blanched almonds, served in syrup. As these were most eagerly sought for by the French visitors, we concluded they must be very delicious, and accordingly we demanded of the waiter that a like dish should be placed in our vicinity, to which we plentifully helped ourselves. Judge of our dismay and wry faces when we found these envied delicacies to be unripe walnuts, with part of the outward green husk pared off, then cut into halves, so as to show the delicately white and immature kernel, and, above all, *served up in verjuice or some other vile acid.* I shall never forget the nauseous compound of bitterness and acidity. To make some amends, a confiture of "*cerises tardives*" (I think our "late duke" cherry) was delicious: the stones were all removed, so that it formed a grateful jelly. We visited the famed abattoirs, which were remarkably clean and very extensive. Numerous calves were here ready for the slaughter; but we remarked that the taste of the good people of Nantes for beef was at a very low ebb, for only one bullock, and he by no means fat, was to be seen in all this immense place, in which is slaughtered the meat required for a population of 90,000. The sheep were loose-limbed thin-carcassed animals, and a red patch on each cheek, just under the eye, gave them a very goatish appearance.

There are but two nurseries at Nantes of any eminence, that of Noisette, and that of Bourtrand. I visited the latter, and found his culture almost confined to magnolias, of which he had a very fine stock. I observed a tree or two of the chaumontelle pear: and, remarking the small size of the fruit, I was surprised by his telling me the climate was too hot for many sorts of pears, particularly the chaumontelle, which, with many others, was dry and worthless.

Angers, July 25.—We departed from Nantes this morning at six, and were eleven hours in steaming up the Loire in a steamer belonging to the "exploitation d'inexplosibles;" one of these lately belied its name, for it blew up at Angers, and killed several persons. We were much delayed in our voyage by the numerous sand-drifts, on which we often stuck fast; and numbers of labourers were at work, with wooden shovels, making a channel for the steamers, which, in a few hours, would again be filled with sand. Had it not been for the extreme beauty of the surrounding country and the vine-covered banks of this famed river, we should have found our voyage very tedious. I observed the vines in many places dipping their shoots into the water, which were laden with grapes; so favourable is this fine climate. Some German venders of brooms, and musicians male and female, were on the deck; these we soon induced to while away the hours by singing and playing. Their seeming wild harmony, but still strictly in time and tune, with the sparkling river and bright sun, made the greater part of our voyage most delightful. The French captain and mate were "bearded like the pard;" and, when on meeting the vessel from Angers they arrayed themselves in their blue and gold uniform, and strutted their hour on deck, we were struck with the contrasting simplicity of John Bull; the captains of our steamboats, two or three times the tonnage and power of our little "inexplosible," being rarely seen but in their professional blue jacket, or, at most, in a plain coat: but the Frenchman likes parade and "much ado about nothing;" still it ought not to be complained of, for it serves to throw a gleam of sunshine on the too often gloomy path of life.

We were much struck with the very pretty situations of many of the towns and villages on the banks of the Loire. I remember particularly Poissonière, a short distance below Angers, entirely surrounded by vineyards: one could scarcely help wishing that one's lot was cast there; but French villages and towns are like many in Wales, more pretty to look at from a distance, than to live in.

Angers is the head-quarters of the nurserymen of France: we were delighted with the gardens and nurseries. They say here that from thirty to forty nurseries are in and about the city. For a population of 33,000, this seems a very large proportion; but Angers supplies a great part of southern and western France with trees and plants. We paid an early visit to the botanic garden, but found it small, and no plants or specimens of any interest in it: in happy contrast was our visit to the extensive nurseries of M. Leroy, Rue des Ponts de Cé, leading to that curious long bridge over the Loire, the junction of which with the Maine takes place a short distance south of Angers. We found this nursery very extensive; perhaps nearly forty acres; the soil a fertile sandy loam, on a substratum of schist; the quarters of fruit trees looked as if they were situated among the chips of a carpenter's yard, for in trenching the schistose rock was brought plentifully to the surface. Our attention was first attracted by Bignòn*ia* grandiflòra covered like a sheet of flame with its brilliant flowers; in every situation, whether trailing on the ground, or trained to walls, it was blooming most abundantly, and presented a most gorgeous appearance. I could not help exclaiming, it was worth a journey to Angers, if only to see this splendid plant. A large quarter, about an acre in extent, of Magnòl*ia* grandiflòra (Exmouth variety), the plants from 6 ft. to 12 ft. in height, trained to single stems for avenues, was admirable for their fine health and vigour. The price of the larger plants was thirty francs; certainly very cheap. We were next attracted by a specimen of Paulòwn*ia* imperiàlis, about 12 ft. high. This tree, with its large cordate leaves, had exactly the appearance of a gigantic sunflower, lacking its terminal flower; in fact, when I returned, on observing a giant sunflower, about 8 ft. high, growing in my nursery, I could not help exclaiming, "Voilà Paulownia!"

This plant was an object of great interest in the nursery of M. Leroy. Its leaves were 2 ft. in length, the same in breadth; petioles 1½ ft. in length. It was growing, as I was assured by the foreman, at the rate of 2 in. per diem. In this most favourable climate it will doubtless soon form a magnificent tree: still I doubt if it will bear sharp frost; for, in spite of the very hot weather, its stem was exceedingly soft and herbaceous; as much so as Fúchs*ia* corymbiflòra turned out in a wet border in England. We saw here fine standards of *Acàcia Julibrissin* in full bloom. They were propagating nearly all the hard-wooded greenhouse plants by layering in small pots in the open air; the surface of the pots covered with moss. They appeared to succeed admirably; but the climate of Angers seems almost to be perfection, as far as regards plant culture. The rose "Noisette Lamarque" bears seed freely, and from it have been raised some splendid yellow Noisette roses. All sorts of moss roses were covered with heps. Melons were growing and ripening in the open borders. M. Vibert, the eminent rose cultivator, has now turned his attention to the improvement of grapes, on which he has published a small treatise. He purposes, by crossing, to obtain high-flavoured muscat grapes as early as the sweetwater and other precocious varieties. I observed a seedling black muscat, which had apparently resulted from a cross with the black sweetwater, nearly ripe on the open wall; but it seemed to inherit the badly setting qualities of the sweetwater, as many berries were small and imperfect. Its flavour was rich and musky. As M. Vibert is very persevering and scientific, he will doubtless make great improvements in this branch of horticulture. I did not observe at Angers any thing remarkable in their culture of pears: it sounded rather oddly in this country of pears, to hear Williams's Bon Chrétien, or "Poire Guillaume," as they call it, extolled as the finest pear known; it is "magnifique, délicieuse, Monsieur Rivers," exclaimed the foreman of M. Leroy.

I noticed in the rose nurseries here the effect of increased light and heat on the petals of some China roses. In this family are some varieties originating in a semidouble rose, well known to amateurs as chameleon, or *R*òsa índica mutábilis: Archduke Charles, Etna, and Rubens are the finest of these changeable roses. In England these are, on their first opening, a pale rose, then deep rose, and the second day, if the weather is dry, crimson, more or less deep. At Angers, the weather warm and dry, their flowers in the third stage were nearly black. I was much interested with the *mélange* of black, red, and blush roses on the same bush; this peculiarity in those few varieties is the more remarkable, as it is quite the reverse of what takes place in the generality of roses; the brilliancy of their colouring, in almost all cases, fading under bright sunshine.

Camellias are cultivated very extensively here. I visited the nursery of M. Cachot, most delightfully situated on the "Promenades du Champ de Mars," a spacious parallelogram with fine avenues on each side. His culture is confined to camellias: the stock was in the best condition. I should calculate that I saw fifty thousand plants of various sizes, all in the finest possible health. Here again was the beautiful Bignòn*ia* grandiflòra, enlivening the walls and borders with its splendour: it seems a general favourite at Angers.

Le Mans, July 27.—We arrived here from Angers, travelling on one of the *routes royales,* macadamised, broad, and admirably kept. I observed it was divided into sections by tin or iron plates, fixed on posts and numbered; the labourers had their hats with corresponding numbers fixed on plates of tin to them: each labourer had the portion of road between each post under his care; they were even *sweeping* the dust from the road, so careful did they seem of it. The country was in fine cultivation, the wheat all harvested. We passed through La Flèche, a large market town, the hedges in the vicinity of which were lined with Quércus *Taúzin.* I observed also a few of the common oak amongst them. The former were absolutely laden with acorns. If these are more nutritive than those of the common oak, they must form abundant food for pigs and other stock. Numerous walnut trees were also by the road side; the fruit equalling in abundance that of the Quércus *Taúzin.* This part of the country seemed indeed highly fruitful. Le Mans is a spacious and ancient city, with a population of 25,000. The cathedral is well worthy a visit. I visited the garden of M. Foulard, a first-rate amateur of horticulture, and was much interested by his collection. Apricots were here growing in the open quarters on dwarf bushes; the large early, or gros précoce,

M. Foulard informed me, was ripe on the 6th; and the "abricot pêche," a large variety of the Moor Park, was just now in fine perfection. The cherries, "royale tardive" and "cerise d'Octobre," were just ripening; the former is our late duke, the latter I had not seen before. Some fine melons were also ripe in the open borders. I here heard of the famous poire épiscopal, raised from seed by M. Bougère. It is reputed to be juicy and high-flavoured, keeping sound till June and July. The soldat laboureur is also a new pear of high reputation, as is the colmar d'Aremberg; these ripen in November and December.

Lisieux (*Calvados*), *July* 28.— At Le Mans we left the *route royale*, and after a tedious journey, in a small and inconvenient diligence, of fifteen hours, through a pretty undulated country, the corn fields all planted with apple trees, we arrived at this ancient-looking market town. It was a busy day for the townspeople, as a grand mass was performed at the cathedral for the death of the Duke of Orleans. The national guard attended the mass, and grounded their firelocks on the stone pavement, making a tremendous uproar, in but ill accordance with religious worship. Objects of interest in horticulture diminished as we left the banks of the Loire. We visited a nursery here, but saw no specimens of new plants worthy of mention, and nothing, as at Angers, to show the effects of a fine climate. M. Oudin treated us with brandy made from cider, which he informed us can scarcely be bought pure. It was a most powerful and agreeable spirit.

As we approached Normandy we were reminded of England, except that in England (unless in Worcestershire and Herefordshire) but few fruit trees are to be found in the corn fields; whereas in Normandy, through many many miles of country, the apple trees are planted, often irregularly and at a considerable distance apart, all over the face of the soil, and the land is mostly arable, which attracts the notice of the English traveller, as it has not the appearance of an orchard. I looked very closely into the wheat and barley crops directly under the shade of the trees, and could not perceive the least difference either in the bulk of straw or quality of the grain. An Englishman at first sight thinks the practice bad, as shade in his country is so injurious to corn crops; but the superior dryness of this climate, and greater abundance of sunshine, will account for the non-injurious effect of planting fruit trees in corn fields. I was surprised to find the crop of apples a total failure: the trees looked full of healthy foliage, but scarcely an apple could be perceived. I believe this failure was chiefly in cider apples, as I afterwards saw trees full of fruit in some gardens. The farmers of Normandy seem a superior race of men to those of Brittany; in short, more like English farmers. I remember seeing at a fair, between Dinan and Rennes, many hundreds of Breton farmers: they seemed all of one grade, neither rich nor poor. I observed many returning from the fair with their purchases of stock. A Suffolk farmer would have turned up his nose with contempt at the smallness of their ventures. Some had one cow and a calf; these were great men: for the majority had some two, some three, others four, sheep of the goatish breed beforementioned; these they were leading by a line round their necks. The whole affair looked, by contrast with our own farmers, poor and miserable enough. Still these people are happy. They have small farms, which in most cases are their own freeholds; they have few wants, and these are all supplied. In that part of Brittany the country seemed peopled by these small farmers; no common labourers were to be seen. Undoubtedly this contributes to the happiness of the people, and offers a striking contrast to the wealthy farmers, large farms, and numerous and ill-paid labourers in our agricultural districts. Whether the general welfare of the country is promoted by this system is another question, and one requiring much consideration to answer.

Honfleur, July 29.— At Lisieux we found that no diligence could be taken to carry us to this little town; we, therefore, bargained for a "cabriolet" for the journey of twenty miles, for which we paid twenty francs. Let it not be supposed that by this name was designated a roomy chaise on springs. Oh, no; *our* cabriolet was a large market-cart on springs, in which were double seats. In this my three friends, myself, and the driver, were amply accommodated, and our "bonne jument," as our driver affectionately called his old mare, jogged along at the rate of four miles an hour to Pont l'Evêque, about half-way, where we rested and partook of "café noir;" thence, after walking up a tremendous hill, a three miles' ascent, we arrived here, descending to the town through a magnificent avenue of elms. The famous Honfleur melons, we ascertained, were grown to the south of the town, at some distance from it: our time did not permit us to view the melon gardens, and we found no other matter of any horticultural interest, so that we crossed the Seine to Havre as soon as possible by the steamer, thence by steam to Southampton; thus terminating a rapid, agreeable, and mentally profitable tour of twelve days.

Sawbridgeworth Nursery, April 4. 1843.

ART. V. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 166.)

LETTER XIII. *Growing Mushrooms.*

I SHALL now fulfil the promise I made you when here, to give you a description of my method of *growing mushrooms;* which is a very easy, simple, but sure method to get them of a good quality, and in great abundance, at all times of the year, if you only manage to get good spawn. There is no vegetable cultivated that is so sought after in a nobleman's or gentleman's kitchen as the mushroom; as I once heard a French man-cook say, "de mushroom is de very life and soul of de kitchen."

The prettiest and most interesting of all vegetable-growing is the mushroom culture. I was always devotedly fond of it, and have been in the practice of cultivating them for the last 25 years. I have seen many different systems tried, but have decided on one settled one of my own for many years; yet I do not say it is superior to any other, neither am I recommending it, or asking any one to follow my advice. I have heard of treatises being written on mushrooms, but I never met with one of them; neither did I ever read a book of any kind on gardening, nor take any interest in reading them, until the *Gardener's Gazette* made its appearance, as I always fancied it was loss of time; but now I am resolved to get every book I can possibly procure, as from time to time I can buy them. Out of the many hundreds of mushrooms, there are but three varieties that I would venture to eat myself. I do not know the specific name for any of them, but I will send you a specimen of each as they come in season; and, if you will be so kind as to try and find out the proper names of them, you will greatly oblige me, as, in my humble opinion, the public ought to be particularly cautioned against purchasing and eating any of those of a dangerous quality, which are sometimes offered for sale.

I will tell you how I discovered the dangerous qualities of mushrooms. When I was about eight years old I was sent to a dairy for a can of milk, and I took care to go early before the dairy-maid was up, that I might go foraging about, as I have since seen all boys will do, after apples, crabs, nuts, walnuts, chestnuts, or any other fruit I could lay hands on. That very morning I was on one of those excursions, and fell in with two fine-looking mushrooms under some chestnut trees. I took them home and got my mother to cook them for my breakfast, ate them, and went about my business; but it was not long before I was taken so dreadfully ill that I can never forget it.

I swelled all over from head to foot, and rolled over and over in my agony. I have often thought since, if I had been nursed for it I should have died; but, being out of the sight of any body, the agony causing me to roll about on the ground was the means of keeping me alive. At the end of three hours I was at the height of my misery, and after that I began to get better gradually; but, when I went home at night, I looked so ill that my mother guessed what was the matter with me. I could not taste, or scarcely look at, a mushroom, for a long time afterwards. I remember well the time when I lived in Essex, I and my men were moving some trees in a plantation, and one of the makers of mushroom catchup came by us, just where there was a quantity of this unwholesome variety of mushrooms, which he thought great luck to meet with, and he eagerly collected them. I addressed him, and asked him how he could make use of such mushrooms. He told me they made the best of catchup, and, by putting plenty of salt and spices to it, the cockneys did not know the difference. I told him he had gathered a sufficient quantity to kill a regiment of soldiers, and that it would be no easy matter to persuade me to taste them.

Before I proceed to describe my system, I must observe that I do not desire any one else to follow it, as it may be an imperfect one, and I do not profess to be perfect in anything, though I intend to try to be so. I do not profess to be a scientific gardener, but I have followed the profession all my life with the greatest pleasure and interest; I know nothing of any other profession; and it is not my intention to answer any letter or questions put to me, on any subject, without the writer puts his own name and address to it.

Every body, after one moment's consideration, must know that nature produces the greatest abundance of mushrooms in parks, old pastures, and meadows, where the ground has not been disturbed for some time. After a tolerably dry summer, in the autumn season, when the weather is temperate and the nights and days nearly of an equal length, get horse-droppings and cow-dung of equal quantities; one barrow of good maiden loam to four of the above; mix it well together backwards and forwards, until it is regularly incorporated; then wet it the same as you would mortar, and well chop and beat and tread it together, just as a potter does his clay for making pots. Then spread it on a smooth surface three inches in thickness to get steady; if it is fine dry weather, it will in two days be ready to cut into pieces the size of a brickmaker's bricks. Leave it to dry, taking care never to allow it to get washed by rain to any extent, or the principal part of its virtue will be lost. When tolerably dry take it to a shed, or some other darkish place. Procure, if possible, some natural spawn from an old pasture or mill-track.

Stack your bricks, and place some of the spawn between every alternate row. Cover it up closely with litter, taking care to look at it in two days' time to see that it does not get too hot; if it does so, uncover it, or it will quickly destroy the spawn, and injure the bricks so much, that, if spawned again, it never works so kindly and strong. If it goes on kindly it will in about 35 or 40 days be ready to unpack. Sort out what is well worked; the remainder, that is not worked enough, stack and cover up as before, taking care to put what is ready into a dry place (without a draught) to get steadily firm, or it will perish. If put into a damp place the spawn will soon run out of it and perish. This must be all particularly attended to. If you do not have good spawn, how can you expect to get good mushrooms? Many people that I have seen use spawn did not know good from bad, and were ignorant of the qualities and properties of it, whether it was perished spawn or not. One observation I must here make, that, when mushroom spawn is once good, if it is taken proper care of, it will be as good after it has been kept seven years as the first day it was ready: the oldest that I ever used was 8½ years made; but I have no doubt it would have been as good if it had been kept 20 years.

To make a bed of any size or shape, take the dung fresh from the stable, litter and all together; but, if it is very strawy, shake out some of the long straw. I like to have well-made stable dung. Then have it wheeled into the mushroom shed, or wherever you mean to make the bed, and add a quantity of good heavy loam to it; enough to keep the dung from heating or fermenting to any extent, and so that it may be altogether of one congenial warmth and moisture, which it will be if made with foresight and judgement; but, if it is allowed to ferment and steam, the very life and soul of the dung is gone. If it is allowed to lie and get washed with rain, it is like the brewer's grains after the liquid has been extracted; the grains will not fatten a beast, neither will the dung, when allowed to lose its good qualities, grow good mushrooms; but they will become of a bad quality, poor and thin: the bed will not continue long in bearing, and will probably show large quantities of small mushrooms that will never come to perfection.

I saw a question that was asked about a fortnight since in the *Gardener's Chronicle*, by a man who appeared to be in trouble about his mushrooms, which showed well, but did not come to perfection; and it was answered, but I believe not exactly as I should have done.

The bed made on my principle will be quite ready to be spawned in about a fortnight after being made. Put the spawn in the bed shallow, just covered; let the bed lie quiet for a week or ten days before casing it, which must be done with about three inches of good stiff holding loam; beat it as firmly as possible down on the bed. Let the bed remain quiet another week; then well beat it with the back of a spade again, and cover it over lightly with hay, litter, and straw mixed together; for, if you cover it with hay alone, it is very apt to quickly draw all the spawn out into it and ruin your bed. Take care to give the spawn plenty of time to work itself regularly all through the bed before covering the bed to any extent, or you will certainly be disappointed, and only get very few mushrooms, and those of a bad quality. I have had beds made on the above principle that have produced mushrooms of the first quality in great abundance for four, five, or six months, picking them constantly two or three times a week.

When the bed has been covered about 20 or 25 days, uncover it, and brush it all over, to take the short rubbish out; shake the litter well, and take all the rubbish clean out. Examine the bed, and, if you find it dry, get a stake or broom-handle and make a row of good-sized holes, all up the centre of the bed; get some boiling water and pour two or three quarts into each hole, stopping the heat and steam in immediately with a whisk of mulching dung to retain the evaporation; it will moisten the bed, and cause a nice congenial warmth. I always make it a rule to water the casing of the bed likewise, with boiling water out of a watering pot with a rose on it.

After the bed has been made about 30 or 35 days, this watering causes a fine congenial warmth if covered down immediately, which should be done. I generally repeat it two or three times, allowing three days to intervene between each time, according to the state of the bed. It destroys every slug, woodlouse, or any other kind of insect whatever that is about, and sweetens the bed to such a degree that mushrooms thrust themselves up through it of a firm good quality all over the bed. But never water a mushroom bed after it is in full bearing, or it will stop bearing, or send them up of a bad quality generally afterwards, and will not continue long. For instance, observe mushrooms when they are growing naturally in parks, pastures, or fields, as soon as the heavy rains come on them they stop bearing. Damp the litter occasionally with hot water, to raise a gentle mist; and if the bed is in a shed sprinkle it all over now and then with boiling water, which destroys every kind of insect, and raises a sweet congenial mist that mushrooms are particularly fond of.

How I came first of all to discover the good effects of using loam amongst the dung was this. Some years ago, whilst I was working for a market-gardener, I was short of dung to form the mushroom beds with, so as to make them come into bearing at the time wanted. I recollected having accidentally seen a mixture of earth and dung once lying outside a farmer's field, full of beautiful mushroom spawn, and I resolved to try it mixed together, thinking it would be the means of keeping the bed cold, that it might be very soon spawned to be in readiness for market at the time wanted; and I was truly astonished, and so was my master, to see such an abundance of mushrooms of a superior quality, and lasting so long; the quality beyond any that we had ever seen before. It did not strike me till some years afterwards about its preserving the quality of the dung, although I never left off practising it, and with the same good effect. I have told many gardeners of it since, and I know they have put it into practice for some years past.

My next letter shall be on potato-growing in all its stages; the cause of curl, dry rot, and my opinion on the great abuse that most useful of all vegetables is subject to in this country generally, as far as I have observed.

Bicton Gardens, Nov. 4. 1842.

ART. VI. *Notices of some Gardens and Country Seats in Somersetshire, Devonshire, and Part of Cornwall.* By the CONDUCTOR.

(*Continued from Vol. for* 1842, p. 555., *and concluded.*)

SEPT. 20. 1842. — *Sidmouth. Peake House;* E. B. Lousada, Esq. This is the largest place in the immediate neighbourhood of Sidmouth. The house is in a commanding situation at the top of an extensive slope which terminates near the sea shore. No expense has been spared to render this declivity uniform, but, as there were a number of trees to be left, they stand on elevated portions of the original surface, which either have not been sloped down at the edges at all, or sloped down so very imperfectly as to constitute glaring deformities. "The ugliest ground," Sir Uvedale Price observes, "is that which has neither the beauty of smoothness and gentle undulation, nor the picturesqueness of varied tints of soil: of such kind is ground that has been disturbed, and left with risings upon it, which appear like knobs or bumps, or gashes into it, such as old gravel pits or quarries." (*Essays on the Picturesque,* vol. i. chap. ix.) It is surprising to see, at a place which bears evidence of a large sum having been laid out on it, the finishing operation of uniting the bumps with the surface on which they stand so much neglected. The cause is evident: the proprietor has entered fully into the subject of improvement, as far as ambition and wealth are concerned, but has not imbued his mind with it in regard to taste. If country gentlemen and ladies would give themselves up as completely to their architects and landscape-gardeners, as they do to their tailors and milliners, such deformities as those to which we allude would not be perpetrated, though the result would probably be nearly as great a sameness in the scenery of places as there is in dress. What then is to be done? Let taste be free, and let every country gentleman do as he pleases. We recommend those who do not think fit to employ a first-rate artist, and yet set some value on public opinion, to study the subject, and superintend their own improvements. It is necessary to be rationally occupied in order to pass the time agreeably, and what can be more rational than the improvement and adornment of that portion of our country's surface which we can call our own? What more conducive to health, to the prosperity of his neighbours who live by their labour, and what more patriotic? Mr. Lousada has the great merit of being unsparing in expense; and, with a few years' experience and observation of other country seats, and some reading, he will acquire a good taste and display it. This is evident from what he has recently done in the flower-garden, in which there are some scenes that might engage the pencil of an artist.

In the kitchen-garden we observed a pine pit heated by hot water agreeably to a mode invented by Messrs. Garton and Jarvis of Exeter, the peculiarity of which is that the hot water can be let out of the pipes into troughs over them at pleasure, so as rapidly and abundantly to supply a moist heat. Of this, and some other improvements made by Messrs. Garton and Jarvis, we expect hereafter to give some account. Mr. Lousada's dwelling-house is replete with arrangements requisite for comfortable and elegant enjoyment, and it contains some good pictures, statues, and books.

A singular place at Sidmouth, belonging to Mr. Fish, was mentioned to us as worth seeing, but Mr. Fish only shows it on particular days, and our day happened not to be his.

Sept. 22. — *Nutwell Court;* Sir Thomas Trayton Fuller Elliot Drake, Bart. This place is extremely interesting on account of some remarkably fine trees which it contains; but in other respects it is crowded, confused, and not carefully kept. Nevertheless it has all the elements necessary to constitute a fine place: beautiful distant views across and along the Exe and to the sea; a varied surface, with hills and knolls; a fine spring of water, as the name implies; a good house, not badly situated; extent of park; and abundance of wood which only requires thinning out. We noted down the following dimensions of trees: Magnòl*ia* grandiflòra 25 ft. high, with a head 30 ft. in diameter, and the stem 14 in. across at 1 ft. from the ground; *Pl*átanus occidentàlis 100 ft. high, with a trunk

5 ft. in diameter; Taxòdium dístichum 50 ft. high, with a trunk 2½ ft. in diameter; *P*látanus orientàlis 60 ft. high, with a head 70 ft. in diameter; *A*'lnus glutinòsa incìsa 70 ft. high, with a regular conical head; *S*àlix Russell*iàna* 80 ft. high, with a trunk 5 ft. in diameter; a tulip tree 70 ft. high, with a trunk 4 ft. in diameter; a very large Lucombe oak; and numerous elms from 80 to 100 ft. high. There are, besides, cedars, silver firs, spruces, Scotch pines, hollies, and various other trees of large size, of which we had not time to take notes. In returning to Exeter, we observed in a cottage garden *P*hlòmis fruticòsa 8 ft. high, with a stem 4 in. in diameter, which ripens seeds in abundance. Throughout the South of Devonshire the *P*hlòmis becomes a large and very ornamental shrub.

Sept. 24.—*Killerton Park;* Sir Thomas Dyke Acland, Bart., M.P. This place is situated on the side of a hill, which slopes gradually and beautifully down to a level country or broad valley on one side of the house, and on the other rises to a summit crowned with wood. Nothing can be more judiciously disposed than the trees on the lower part of the slope, and in the level valley. Immediately in front of the entrance to the house the surface contains very few trees, but at a short distance these commence, at first thinly scattered and sparingly grouped, and then increased in number till the groups unite into masses, and the masses are lost in one grand valley of wood. The surface of this wood is fully commanded by the eye from the house, and forms a grand and effective contrast to the rest of the place. As a contrast to this wood in front of the house, which is looked down upon, we have another behind and at each side to which we look up. Turning to the pleasure-ground side of the house, we have smooth glades between masses of rhododendrons and other finely tufted shrubs, which lead the eye up the trunks of the trees which form the venerable wood crowning the hill on the side of which the house stands. This hill to the right and left of the house affords many fine walks, commanding extensive prospects. Some of these walks, particularly the one leading to the chapel, are nearly level in regard to surface, but, as they follow the windings of the slope, they are exceedingly varied in regard to direction; and this, in our opinion, constitutes one of the finest descriptions of walk that can any where be made. There is much to admire at Killerton, both of natural feature and artificial treatment, for Sir Thomas Dyke Acland has an excellent taste in landscape-gardening. There are many fine old trees, the dimensions of which will be found in our *Arboretum*, including a remarkably large tulip tree close to the house: in 1834 it was 63 ft. high, with a thick trunk, and a very wide spreading head; and the trunk, we were informed, has since increased several inches in circumference. There are here some of the largest Lucombe oaks in the country, and, in short, very large specimens of most trees in cultivation half a century ago. In an architectural flower-garden we observed a very effective and economical imitation of stone flower-baskets. They are formed of paper-printers' blocks after they are no longer of any use to print from. These blocks are made of the best oak, square in shape, and when painted and sanded they bear a close resemblance to sculptured stone. All that they require is a framework in which to fix them as panels. The price is little more than that of old wood sold for fuel. These blocks are also well adapted for forming the panels to fixed garden benches, boundary parapets to architectural flower-gardens, and for various other garden purposes.

A very handsome Gothic chapel has lately been erected in the grounds from the design of C. R. Cockerell, Esq. It is situated at the extremity of the beautiful walk already mentioned, near the public road, so as to be convenient for the public who choose to attend, and on ground so far elevated as to form a fine object from various parts of the surrounding country. It stands on a terrace, and the principal approach to it is through an avenue of cypresses.

The house is commodious, and rich in books and pictures; and we were particularly gratified with seeing the numerous very artistical landscapes and sketches made by Sir Thomas in different parts of Europe. There is no study whatever equal to that of sketching landscape, for giving a just taste in landscape-gardening. It is difficult to conceive how persons with minds little cultivated by the study of prints or pictures, and who have not sketched a good deal, can understand the value of breadth of light and shade, of connexion, of grouping, of symmetry, of contrast (the most important ingredient in all composition, whatever may be the line of art), and of a whole. Without this kind of knowledge all attempts at landscape-gardening must be little better than random work. Without this science of landscape, as it may be called, no person can give a sufficient reason for what he proposes, or foresee its result. At the same time this knowledge alone is not sufficient: a knowledge of trees and their culture is equally requisite; for otherwise a design may be made that cannot be carried into execution, or commonplace sameness may be the result, instead of arboricultural variety.

There is a good kitchen-garden, well cropped, and the fruit trees carefully trained. We noticed in particular some vines on the open wall trained horizontally, and bearing abundantly. The whole place was, and we were told at Exeter always is, in excellent order, for which much praise is due to Mr. Craggs, the gardener, as well as to his enlightened and kind-hearted employer.

Silverton Park, the Earl of Egremont, is separated from Killerton by the river Culm; and the finely wooded hill which we have mentioned as forming the apex to the landscape of which Killerton House is the main feature, is the principal object in the view from the house at Silverton. This house is situated in an inner angle formed by the concurrence of two immense banks, on the site of an old mansion. The greater part of the new building is not yet finished. It is eminently classical, abounding in colonnades and porticoes, without a single vulgar feature externally; the interior we had not an opportunity of seeing. The appearance of the entrance front gave us the idea that the house was sunk much too low; but this impression is not made by the pleasure-ground fronts. As the whole place was undergoing a course of improvement, we could not judge what will be the ultimate effect.

Sept. 26. —*Poltimore House*, Lord Poltimore, is an extensive place, with a flat surface, and a house which appeared to us too low for the situation. There are ample space and scope for improvement in the neighbourhood of the house, and few situations are better adapted for an architectural garden. There is a fine lime tree avenue to the church.

Sept. 29.— *Winslade House*, Henry Porter, Esq., possesses naturally some fine features, and much has recently been done by art. There is a terraced garden in front of the house, which conducts by a succession of levels to a piece of water, along which there is a broad gravel walk, separated by an enriched parapet. The design and execution of the terrace-work and the parapet next the water are good, with the exception of some slight details. There is an excellent kitchen-garden; and, on the whole, the place is remarkably complete in every requisite for substantial and refined enjoyment. There is a rosary laid out and planted by Mr. Pince with great taste (of which he promised us a plan and list); and various rustic structures designed by Mrs. Porter. In the house are many rare and valuable articles of *virtù*, sculpture, pictures, books, &c., recently brought from Italy and Germany, more especially from Dresden; and, among some beautiful specimens of foreign birds, we observed the Bell bird of Mr. Waterton, its plumage beautifully preserved.

Sept. 26. to 29. — *Heanton Park, near Torrington;* Lord Clinton. This is a place of great extent, and capable of very great improvement. The house is situated on an immense bank, with another immense bank facing it, about a mile distant, with a broad valley between, the whole or any part of which might be covered with water at very little expense, or might be laid down in meadow or covered with wood at pleasure. This broad valley joins a narrow one with lofty banks covered with natural wood, the whole or any part of which might also be flooded. Every natural feature here is on a large scale, and the arts required are chiefly draining and planting, both of which, as far as they have been carried, evince good judgement. The masses of trees in the park were projected by Mr. Gilpin, and are judiciously placed. Various recent improvements have been devised by His Lordship and his intelligent gardener Mr. Cato; and we had the honour of staking out an approach above a mile in length. The house is not large, but it is well arranged, and, as far as a stranger can judge in a day or two, it cannot be better placed. In a shrubbery walk there is a living arbour, formed by Mr. Cato, of ash trees, in the manner recommended in our Volume for 1841, p. 312., which has succeeded admirably. The kitchen-garden and nursery grounds here, as well as the pleasure-ground, are kept in excellent order. The agriculture, like that of Devonshire generally, is very bad; but Lord Clinton is using every exertion to improve it, as hinted at in our Volume for 1842, p. 658. Lord Clinton, who has resided some time in Scotland, is well aware of the defects of the agriculture on his estate, but, with true benevolence, is unwilling to change any of his tenants, preferring to instruct them. For the latter purpose, he has encouraged the formation of an agricultural society, of which he is president; and the papers read at the meetings, when considered worthy of publication, are printed at His Lordship's expense. His Lordship has also built a school and schoolmaster's house, and is improving the labourers' cottages and the farmhouses. In a word, he appears to be proceeding judiciously with all the more important improvements of which Heanton Satchville is susceptible.

Stevenstone, near Torrington, Lord Rolle, is a very old place, chiefly remarkable for very large trees, and for a boldly undulated surface. It is capable of immense improvement, in consequence of hollows that might be flooded with water, and eminences that require planting. The house is very old, though there is nothing worthy of notice in its architecture. It is low, occupying three sides of a long narrow court: the connecting side, or extreme end, containing the principal living-rooms; one side terminating in the offices and stables, and the other in the family chapel. The library, as a protection from fire, forms a detached building in the garden. There is a peculiarly quiet and melancholy expression about this place, which we think we can trace to its having little or no appearance of being inhabited, to the prevalence of grass, and the absence of gravel walks, especially of winding ones, and to the park being, as far as we remember, totally without young trees. Well-kept gravel walks always give the idea of occupation; and young trees, with their protecting fences round them, seem to show that improvements are going on. A lodge has been recently built here, which ought to be noticed for the bad taste which it exhibits: not to speak of its architecture, which wants some characteristic features of the style, we shall merely mention that painted stags' heads are built into a rubble wall without any preparation, and that the Rolle arms are placed on the piers of the gates, not so as to front the public road, but edgewise towards it. It is much to be regretted that proprietors in the country, when they do not employ a regular architect, do not submit their own, or their carpenter's designs to one. For two guineas, any London architect would have pointed out the exterior faults in the pitch of the roof, form of the windows and doors, and defects in the placing of the ornaments in the structure to which we allude; and the stags' heads and the arms, instead of being deformities as they now are, would have been appropriate ornaments: and all this, with the exception of the architect's fee, at no greater expense than has been incurred.

At Torrington we called at Mr. Fowler's, the author of the *Thermosiphon*, a pamphlet on heating by hot water on the siphon principle, reviewed in our Volume for 1829, p. 453. Mr. Fowler, who was a banker and bookseller, was too ill to be able to see us, and is since dead.

In going from Torrington to see the inclined plane on the Rolle Canal, we looked down upon Ware Gifford, Lord Fortescue, and on Cross House, Mrs. Stephens, both situated in a rich valley. The Rolle Canal, and the various works connected with it, must have greatly benefited Torrington and the neighbourhood, and they do honour to the memory of Lord Rolle.

We have now noticed most of the gentlemen's seats which we saw in Devonshire, very briefly and imperfectly, from having taken no notes, and from having delayed to put down our recollections before most of them had escaped from our memory. Their brevity, however, is perhaps an advantage, because, if they had been much longer, we could not have found room for them. Before closing this article we shall notice the general impressions made on us by the face of the country and its agriculture, and by the labourers' cottages.

Roads.—The greater part of Devonshire, more particularly of the south part, seemed very badly arranged in respect to parish roads. Owing to the small size of the fields the roads are far too numerous, and it is to the same cause that we must attribute their circuitous direction and their narrowness. We have already noticed the high hedge banks which accompany these roads, and prevent the traveller from seeing into the fields except when he comes to a gateway. We feel confident that we do not exaggerate when we say that in many cases the ground lost to the proprietors by the lanes and fences, which would be superfluous if the ground were properly laid out, amounts to from 10 to 20 per cent. Proprietors of lands of great extent may remedy this evil themselves, but in general it would require the cooperation of the district. In either case a survey should first be made, and not only the roads and fences, but the inclination of the surface, natural drainage, and course of water ditches and brooks pointed out; and from this plan, jointly with the careful examination of the ground, a re-arrangement of the surface into shorter lines of road, straighter hedges, ditches, and brooks, and larger fields, might be determined on. Even if the direction of the roads, and the general drainage, were rectified on sound principles, much public good would result, and the arrangement of the fields and farms might be left to the proprietors.

Cottages.—These are not bad in the same proportion as are the general arrangement of the country and the agriculture. There is a greater sympathy between the cottage dwellings and those of the smaller farmers. In Northumberland, where there are scarcely any small farms, and where the farm-houses are almost as large as gentlemen's seats, there appears to be no sympathy between the dwelling of the farmer and that of his labourer, and the cottages are hovels of the most wretched description. (See our Vol. for 1842, p. 31.) In this respect Devonshire and Somersetshire are as far before Northumberland and Berwickshire, as they are behind these counties in agriculture. Nevertheless the cottages in Devonshire are susceptible of much internal improvement, more especially in the north; and, neither in the north nor in the south, do they appear to have been at all considered by the landed interest as objects of taste. This will not be the case in any country, till the subject of the improvement of cottages is taken out of the hands of farmers and land stewards, and undertaken by proprietors themselves. The farmers are jealous of their cottagers, to such an extent that, in some places that we could point out, they disapprove even of their children being sent to school; and the stewards are jealous of any improvement that does not originate with themselves, as it seems to reproach them with neglect of duty, or to give them extra trouble. Of course there are many exceptions.

The Agriculture of Devonshire appeared to us worse than that of any other English county, but, in consequence of the warm moist climate, grass is produced in abundance throughout the year, and thus the deficiencies of arable culture are in some measure compensated for. The corn crop being everywhere removed, we had an opportunity of seeing the stubbles, which were everywhere foul, indicating shallow ploughing and bad fallowing. The best parts of the farm-yard manure are allowed to be washed away by the frequent rains, and the weeds in the hedges and by the road sides are allowed to ripen their seeds, which are disseminated over the cultivated grounds, by the winds in some cases, and the birds in others. We saw one or two thrashing machines of the very worst construction. But it is unnecessary to say more than that 15 tons per acre are reckoned a good crop of turnips, in a county which abounds with some of the best turnip soils in England; and the climate of which, from its warmth and moisture, is peculiarly favourable to the culture of that root and of the potato. In a word, with the exception of the grass lands, the cattle, and the culture exhibited by the bailiffs on one or two gentlemen's estates, we saw nothing that we could commend.

In proportion as Devonshire is in a backward state in respect to rural improvement, notwithstanding its fine climate, in the same proportion is it susceptible of amelioration; and we amused ourselves, while travelling from one point to another, in fancying what we should do if we had the command of an extensive Devonshire estate. As the celebrated Arthur Young, in his *Annals*, indulged in a reverie of the same class*, we trust the precedent will be accepted as an excuse for inflicting on the reader two or three additional pages having reference to this county.

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* "'I wish I was a king,' said a farmer's boy: 'Why, what would you do if you was a king?' 'I would swing upon the gate and eat bacon all day long.' So I also may wish I was a king; if I did, it would be for the pleasure of executing such a plan as this for a personal amusement. I would send a message to the House of Commons, desiring to be invested with a power, on my own personal examination in any progresses I might make through my dominions, of ordering the necessary enclosures, buildings, and expenditures for the establishment of farms in tracts now waste. And I should be very well assured that my faithful Commons would not refuse it. They would, on the contrary, be happy in promoting the royal pleasures that had for their end the cultivation, improvement, and population of the kingdom. They would rejoice to see the presence of their sovereign diffusing industry; making barren deserts smile with cultivation, and peopling joyless wastes with the grateful hearts of men, who, through these efforts, had exchanged the miseries of poverty for cheerfulness, content, and competence; rearing the quiet cottage of private happiness, and the splendid turrets of public prosperity. These should be my amusements; doubtless they are such as kings would look down upon with a contempt equal to mine at the swinging and bacon of a country boy. But I should feel an enjoyment as refined, perhaps, as that which arises from desolated though conquered provinces, from the triumphs that military glory erects on the ruin and sufferings of humanity. And when I died my memory would have the honour of being forgotten; for I should rank with those kings of ancient days, *dignes sans doute de nos éloges puisque l'histoire ne les a pas nommés.* (*Chastellux de la Félicité publique*, Amst. anon.) The sentiment is more just, though not so strikingly expressed as that very pretty one of D'Alembert, who, praising Charles V. of France, adds, 'Quoique moins célébré dans l'histoire qu'une foule de rois qui n'ont été qu'heureux ou puissans.'" (*Annals of Agriculture*, vol. i. p. 62.)

1. *We would remove no tenant or labourer from the estate, however deficient he might be as a cultivator or a workman;* because their present condition is the result of the circumstances in which they have been placed by preceding proprietors, and by the neglect of the local clergy. We would engage a man acquainted with the best practices in that kind of husbandry which is most suitable to the soil and climate, and we would let him have a man, a pair of horses, a cart, and a set of suitable agricultural implements at command; and with these, according to the season, he should go from farm to farm over the whole estate, and teach the best practices, and give the reasons, as far as they could be understood by the tenants, why one mode was better than another. In the case of a naked fallow, or the culture of turnips, this man would arrange to have a ridge to prepare and cultivate in his mode in the same field in which the farmer pursued his ordinary culture, and so of every other operation and crop. For example, if a field was to be broken up for oats, our locomotive instructor should have a ridge in it to show the advantage of deeper ploughing than is generally practised, and of sowing a better variety. In this way we would continue for years to teach improved modes of culture and management, by degrees introducing improved rotations, breeds of horses or cattle, implements, machines, and even farm buildings; granting or extending the leases, so that the occupants might always be assured of continued possession, whether they adopted the improvements immediately or not.

2. *For the improvement of the labourers,* we should first have a survey made of every cottage on the property, in which there should be plans, elevations, and perspective views of their present state, including their gardens, with other plans, elevations, and views showing how they might be improved; and such as could not be improved we would take down and rebuild. Before determining what was to be done, we would consider the situation of all the cottages on the estate relative to the farms on which the men were likely to be employed, the mill in which their corn was likely to be ground, the school to which their children should be sent, and the church and burying-ground. We would always, if possible, have the cottages in small villages or in groups, that the occupiers might protect, assist, or communicate with one another more readily; and that they might, in certain cases, have a common washing-house, bakehouse, brewhouse, drying-ground, play-ground for their children, &c. Other ideas which we entertain on the subject of cottages need not be repeated, as they

will be found in our Volume for 1842, p. 637. to p. 642. Having fixed on a central situation for a school, we would build one sufficiently commodious for the population within a certain circle, say under two miles in diameter, with a proper house and garden for the teacher. The only compulsory measure that we should propose would be, that every child on the estate should be sent to this school till it was fifteen or eighteen years of age, or to some other school equally good. The greater part of the schoolmaster's salary should be paid by the proprietor, and the remainder by the children of the tenantry, or of other persons on the estate not day labourers. The education of their children should be considered as part of their wages. In the schools the boys would be taught a little of carpentry and of all the building arts; and in the school garden the operations of horticulture, and the reasons for them, and enough of botany to enable them, in any country, to distinguish edible plants and fruits from such as are poisonous, and the comparatively edible season of even poisonous plants, viz., when the sap is rising. In short, the education of the boys should be such as would fit them for emigration. The girls would be taught cookery, housewifery, clothes-making and mending, and the art of taking care of children. Children twelve years of age and upwards should be allowed to work a certain proportion of every day for the benefit of their parents. Grown-up men and women that could not read or write we would have taught, if they were willing to learn, privately at their homes, or in the school at particular times. We would teach at school morality, as founded on our innate sense of justice, and on our experience of its utility, and charitable and liberal feeling towards all religions and opinions of every kind, so long as these opinions were not attempted to be forced on others: but we would allow no particular religion to be inculcated by the teacher; leaving that matter entirely to the parents of the children and the clergy of the church, chapel, or meeting-houses to which they belonged.

3. A portion of the payment of all the labourers should be the rent of their house and garden, the education of their children, and a certain quantity of wheat, barley, potatoes, bacon, and mutton; a mill being established on the estate for the purpose of grinding their wheat into flour, and a malthouse for malting their barley and grinding it. We would employ a plain cook to go round and teach the mistress of every cottage how to make the most of her food, and advise also as to other points of housewifery.

4. To enable the labourers to make the most of their gardens, we would engage a gardener to go round among them weekly,

and instruct them in every point of culture and management; and to furnish them with trees, shrubs, and every requisite plant, root, or seed from our own garden and nursery. We would assist them to form a society for the encouragement of cottage gardening, in which premiums should be given for produce, and for order and neatness as displayed both within and without the cottage.

5. We would allow none of the aged poor on our estate to be sent to the workhouse, or to be relieved otherwise than at home among their relations; but if there were several aged poor who had no relations in the village, or none that they particularly cared for, or that cared for them, we might, for the sake of their comfort, bring them together in one house, and have their food prepared by one of their neighbours, or by a person employed as housekeeper to them.

6. Having provided for the comfort of the grown-up and aged poor, and for the education of their children, we would go a step farther than many persons would think desirable, and provide for their amusement. For this purpose we would have a large room attached to the school-house, which might serve as a theatre for comic representations, a lecture-room, a music-room, a dancing-room, and on the walls of which pictures might be hung, or shelves or cases attached containing specimens of articles of natural history, antiquities, or whatever could be got to create an interest. We would hire different persons at different times to give amusing lectures, comic recitations, tableaux, and a variety of other kinds of amusement in this room. We would even introduce theatricals when a strolling company afforded an opportunity; and, as an occasional treat, we would bring down a conjurer from London. When we could get nothing better, the schoolmaster should appoint some of his boys to read, recite, relate anecdotes, or explain prints from the desk, during a certain portion of every evening.

7. Having cared for the immediate comfort and enjoyment of the tenants and labourers, we should now proceed, or the process might be going on at the same time, to permanent improvement and ornament. Roads, water-courses, drains, fences, farm-houses, and masses of plantation, should be arranged to the best advantage. The hedges adjoining the roads we would render ornamental by introducing foreign trees in them, particularly such as were of fastigiate growth or conical forms, so as not to injure the adjoining lands. Every farm-house we would render architectural; and, if its garden were surrounded by a hedge, it should either be of ornamental or fruit-bearing plants, cut, but not clipped, or of thorn, hornbeam, beech, holly, yew, &c., clipped architecturally. Every farm-house should have a good orchard, including walnut and chestnut

trees for shelter. We would arrange a drive or ride from the mansion house through the property, which should display the whole of it, without going over any part twice; and by means of tunnels under roads in some places, and arches over them in others, we would prevent the necessity of opening and shutting many gates. By means of narrow strips of plantation, double hedges, and strained wire fences, this can be done to a much greater extent than most people imagine. We would add to the income of the clergyman of the parish if it were necessary; and, with his approbation, improve the church and churchyard.

8. Having attended to the comfort of every person around us, and to the improvement of the estate as a property, we should next bend our attention to the family mansion, our home farm, park, plantations, and gardens, which we would endeavour to render models of their kind.

So much for our *beau idéal* of what we think we should do if we were an extensive landed proprietor in Devonshire; but, to realise our suggestions, would require a degree of moral courage and devotion to the subject that can hardly be expected to be met with. Such a course of reformation would, in many, perhaps in most, cases, be met by the opposition of all the stewards, agents, and upper servants, whose business it is to get through their duties with as much ease to themselves as possible; and it would even be resisted at first by the tenantry and by the labourers. A determined spirit, however, on the part of the proprietor, and perseverance, would overcome every difficulty; and the consciousness of effecting a great good directly to a number of individuals, and by example to the public, while we were at the same time greatly increasing the value of our own estate and benefiting our offspring, would be an ample reward.

Art. VII. *Recollections of a Gardening Tour in the North of England, and Part of Scotland, made from June 22. to Sept. 30.* 1841. By the Conductor.

(*Continued from Vol. for* 1842, p. 606.)

Aug. 11. — *Stirling to Edinburgh.* We could only reconcile ourselves to leaving Stirling so soon, by hoping one day to return to it, and to the Royal Hotel, a most excellent inn. We took the steamboat, and cannot help noticing the very defective arrangements for going on board, and the dangerous practice of racing; there being two rival vessels. Though an accident, attended with loss of life, had occurred only the day before, the racing was still continued, which, with the rain and mist, greatly diminished our enjoyment. We could not help thinking that if the captains of these vessels had been taught at school something of the laws of motion, they would not have been so foolhardy; a remark which will apply also to coachmen, and to persons who attempt to save themselves by jumping out of carriages in rapid motion. It is, we believe, in part owing to the want of this kind of science, that soldiers and sailors perform such courageous feats; great courage being generally accompanied by great ignorance. Cultivation and comfort make men comparatively tame and cowardly; and they can only be roused to place themselves in circumstances in which life is in danger, by a strong sense of duty, and of shame at its non-performance. This is, essentially, the grand security that wars of aggression will ultimately cease.

At a short distance from Stirling we pass Cambuskenneth Abbey, a considerable ruin, partaking, from its high walls, of the character of a castle; but, as the walls are without ivy or vegetation of any kind, a stranger is left in doubt as to their antiquity, and the idea arises that it may possibly be the remains of a modern building, the interior of which has been destroyed by fire. Ruins with which the idea of time is not associated have little or no dignity; and the idea of time cannot be given more effectually than by the appearance, on the walls, of that kind of vegetation which considerable time is required to produce, such as ivy and trees, which every one knows to be of slow growth.

All our readers we presume to be aware of the unrivalled beauty of the scenery on the banks of the Forth between Stirling and North Berwick. The banks of the Thames between London and the Nore exhibit greater richness of vegetation, and more wealth and taste in the buildings, but they are without that grandeur and variety of character which arise from the great and abrupt variations of ground, and the distant hills and mountains, which are seen on every side of the Forth, and by its windings continually changing their position. Granton Pier, where we landed soon after midday, is one of the best constructions of the kind in Scotland. It is entirely the property of the Duke of Buccleugh, and is at once a great accommodation to the public, and a benefit to the estates of that wealthy and patriotic nobleman. Much as His Grace, since coming of age, has laid out in building and territorial improvements, we question if it is more than some other noblemen have wasted in gambling and horse-racing. How different must be the feelings, on reflection, in the one case and in the other!

Aug. 12.—*Edinburgh to Stranraer.* We went by mail to Glasgow on the common road, for the railroad, though nearly finished, was not yet opened. Though every part of this road was familiar to us in 1806, yet we could now with great difficulty recognise only a few natural features, and some bridges and churches. What were newly made plantations when we last saw them had now become full-grown woods, and country-houses and substantially built cottages have been increased by hundreds. We could not help remarking, throughout, the wonderful difference between the gardens and grounds of similar dwellings in the central and southern counties of England. While the English gardens at this season are teeming with flowers, those on the Glasgow road exhibit scarcely any, and only three or four kinds of shrubs. The cold nakedness of the white and grey stone fronts, and the blue slate roofs, are anything but inviting to the eye that has been accustomed to brick walls, varied by China roses and honeysuckles, and tiled roofs partially covered with vines. Comparing them in idea with the road-side cottages in Surrey, Kent, Sussex, and Hampshire, how astonishing the difference! And yet the occupant of the Scotch cottage, being a far more provident being, is in much more comfortable circumstances than the English cottager. His grand sheet anchor is the oatmeal, which enables him to eat at so much less expense than the English one; but perhaps the habit of forethought is of still more value than the oatmeal.

From Glasgow we took the railroad to Ayr, and thence the mail to Stranraer, where we arrived between 2 and 3 o'clock in the morning. Great part of the road is along a rocky shore, against which the dashing of the waves roused the attention and awakened long trains of ideas.

Aug. 13. to 28. — *Culhorn House;* the Earl of Stair. The nucleus of this mansion was originally a barrack for the dragoon regiment of Marshal Stair, about the beginning of the last century; but, on Castle Kennedy, the ancient seat, being burnt down, the family were compelled to resort to Culhorn, which has ever since been the residence of the Earls of Stair in this part of Scotland. It has been added to by the different successors of the marshal, and now contains some large apartments, with adequate accommodation in other respects for the ample hospitality exercised by the great landed proprietors in Scotland. The situation is near the sea, and great part of the property has, at no very distant period, geologically speaking, been a series of low sand hills, with intervening meres or marshy lakes. The family estate here consists of nearly 100,000 acres, chiefly of excellent turnip soil, in a moist climate, and so mild that the fig lives as a standard without any protection, and sometimes ripens its fruit. Both figs and grapes are frequently ripened on walls. There is a beautiful and very distinct variety of the common ash on the lawn, in the library front of Culhorn House, which is worthy of being propagated by nurserymen. It is doubtless a seedling, and planted there without any knowledge of its being different from the normal form of the species.

Castle Kennedy, when we last saw it in 1804, was one of the most singular places in Scotland, or perhaps in Europe. In 1841 we were called on professionally by Earl Stair to give a design for restoring it, and as we have received the earl's permission to publish this design, we intend to do so in an article by itself, in which the details will be found accompanied by engravings which would otherwise have been given here.

Aug. 28. — *Broadstones;* John Murray, Esq. This is a beautiful little spot on the Bay of Stranraer, the property of a much respected literary and scientific gentleman, a native of the town. The garden is rich in plants, more especially in all those which are employed in the arts, whether hardy or exotic; the latter of course being kept under glass. A part of the grounds consists of a steep wooded bank which Mr. Murray has laid out in terraces with great taste. We were quite astonished at the number of half-hardy shrubs which we found on this bank, enduring the open air as well as, or better than, they do in the neighbourhood of London. Mr. Lamb, who was with us at Culhorn House, has designed a house in the Swiss style for Mr. Murray, which is worthy of notice, both as a design, and because it admits of being very economically executed (650*l.*): the plan and elevation are given in our *Supplement* to the *Enc. of Cott. Arch.* p. 1195.

Stranraer to Ayr. Before leaving Stranraer we went to look at the burying-ground of the kirk, and found it a very limited spot in a state of desecration, which will be noticed in our article on cemeteries; but, as soon as Lord Stair was aware of its condition, with his accustomed liberality and public spirit, he presented the town with an additional piece of ground. Architecture in Stranraer is in a very low state, and the town does not contain a single building, church, chapel, meeting-house, or dwelling-house worth notice, unless it be a house and garden belonging to Sir John Ross, which has a basin of salt water communicating with the sea at high water, for the purpose of retaining a stock of live sea fish. The same idea was realised many years ago by Macdoual of Laggan in Wigtonshire, and Sir Robert Preston at Culross. (See our Volume for 1842, p. 591.)

On the road to Ayr we passed Loch Ryan House, Sir Alexander Wallace, made conspicuous by whitewashing, which renders most of the villas in this part of the country spots in the landscape. The taste is no doubt that of the mason employed, who ought to be told to mix some soot and yellow ochre with his lime, so as to produce a grey tint. There is a great want of handsome specimens of architecture in this part of Scotland, in every department, from the cottage to the villa, and it is to be hoped that the Earl of Stair will commence a reform in this respect, by erecting some handsome and comfortable cottages in different styles, and rebuilding some of his farm-houses. Something also may be expected from the Earl of Orkney, on whose property at Ballantrae a lodge has recently been built, and some plantations made. There is this great satisfaction in making improvements in this comparatively neglected part of the country, that they are certain of attracting public attention and procuring "the world's applause."

Mr. Lamb was delighted with the wildness of the country through which we passed to Ayr, and with the grandeur and singularity of the rocks along that part of the road which touched on the sea coast. He afterwards made a sketch from memory (*fig.* 58.) of the normal form of a portion of a row of the road-side cottages with their stone walls and thatched roof, and without front gardens, with other sketches (*figs.* 59. to 62.) showing how the same materials might be disposed somewhat more architecturally. It is but justice to Mr. Lamb to state that the engravings from his sketches, having been made by an amateur at an early period of his progress, do not do justice to the originals. To an architect or a builder, however, they will be quite sufficient to indicate what is intended. The object is not to render the cottages ornamental, but merely to confer on them somewhat more of an architectural character than they at present possess.

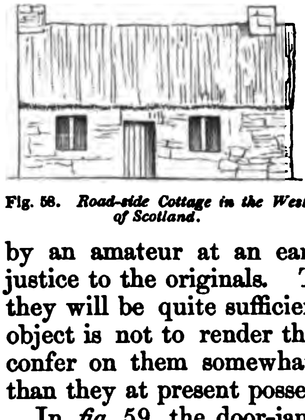


Fig. 58. *Road-side Cottage in the West of Scotland.*

In *fig.* 59. the door-jambs are brought forward and covered with two flat stones so as to form a sort of porch; while the ground is lowered so as to admit of a rise of one step into the porch; the windows are shown arched, and the chimneys raised a little and finished with a squared stone; a gutter is added to receive the rain from the roof, and a vertical tube from this gutter conducts the water to a stone box, from which it may either pass into a waste drain, or be filtered and sink into a well to be drawn up by a pump inside the house.

Fig. 60. shows a porch, the roof of which is composed of two flagstones; a plinth to the walls; one step of ascent; the windows with a flat arch and a keystone; a gutter as in *fig.* 59.; and the chimneys with lateral openings, one on each side, the perpendicular opening being closed by a broad flat stone.

Fig. 61. shows the door and windows arched, the sills to the

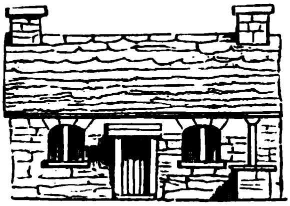


Fig. 59. *Road-side Cottage somewhat improved.*

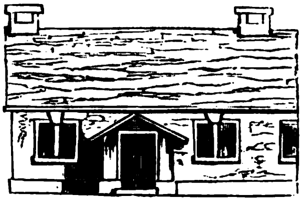


Fig. 60. *Road-side Cottage, with the addition of a Porch and covered Chimney Tops.*

lower windows supported by brackets, a tablet over the door for the name of the cottage or the builder, the chimneys with plinths, a plinth to the walls, and a rise of a step, and a water gutter as before.

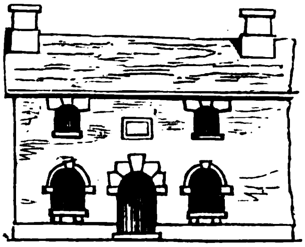


Fig. 61. *Road-side Cottage of Two Stories.*

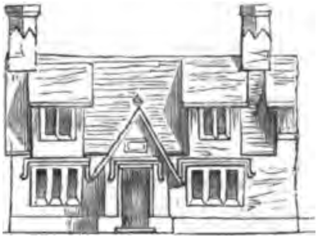


Fig. 62. *Road-side Cottage in the English Style.*

Fig. 62. shows windows, steep roofs, and chimney tops, in the old English style.

It is proper to observe that, if these figures had been intended to represent detached cottages, they would have been rendered much more ornamental by giving an architectural character to the gable ends.

August 29.—*Ayr.* This being Sunday no public conveyance is allowed to leave the town in the daytime, and we were therefore obliged either to take a postchaise, or wait till the evening for the mail. We chose the latter, and spent the day in Alloway kirkyard; in the grounds of D. Auld, Esq., the conservator of Burns's monument; at Newark Castle; and in walking through the town.

Alloway Kirkyard is extremely interesting on account of the associations it calls forth connected with Burns, which circumstance has occasioned it to become quite a fashionable burying-ground for the better classes of all the surrounding country. A grave in Alloway Kirkyard now costs nearly as much as one does in the Kensal Green Cemetery. The chapel walls here, and those of the old church of Loggie (Vol. for 1842, p. 594), show how much depends on the bell turret and the surrounding burying-ground in conferring a sacred character. The unroofed walls of both kirks might otherwise be mistaken for barns. The remains of a chain depending from the bell in the turret of Alloway Kirk heightens the effect. The last baptism which took place in Alloway Church was in 1756. On referring to our notes made on Kirk Alloway when we saw it on August 20. 1831, we find that some of the nurserymen of Ayr planted a row of ornamental trees round the churchyard, but that they were no sooner planted than pulled up, and laid down on the ground, to show, as it was supposed, that it was not in order to steal the trees, but on account of the supposed desecration by the act of planting them; many of the strict Presbyterians objecting to ornamenting a churchyard in any way. The ground is now crowded with tombstones, and there is not a walk through it, or around it, of any kind; nor is the grass kept short, nor any means taken to prevent the kind of desecration so common in churchyards in Scotland, in consequence of the want of places of convenience, and of the habits engendered in consequence of this want. The interior of Burns's monument is not allowed to be shown on Sundays, but we were permitted to walk in the garden which surrounds it.

Dounbrae Cottage, or, as it is sometimes called, Kirk Alloway Cottage, is the residence of D. Auld, Esq. It is situated on the river Doun, close to the new bridge, and near to Mungo's Well, and in short in the very heart of the memorials of Burns. (See our Vol. for 1833, p. 13.) The bridge consists of one semicircular arch, said to be nearly as large as that of the Rialto in Venice. The grounds consist chiefly of the steep, rocky, woody bank of the river, in which Mr. Auld has cut walks, and formed terraced gardens containing fountains, and a great variety of interesting features. There are an excellent house and offices, and a good kitchen garden. The walks along the wooded banks are most delightful, and, like every thing else about the place, they are kept in the highest order. We sat down on a bench under a projecting ledge of rock, in which a swarm of bees had resided for several years, and were almost lulled to sleep by the loud murmurs of the river some thirty or forty feet beneath, its sparkling waters seen through the branches of the overhanging trees. On noticing to Mr. Auld the lulling effect of the waters and of the heat of the day, he took occasion to relate what actually took place with one of his servants, who being sent out to look for the gardener sat down for a moment, as she thought, on that bench, but was lulled to sleep, and slept for several hours, to the great alarm of the family, who feared she might have fallen into the river. Mr. Auld has the great merit of having been the chief instrument of getting the monument to Burns erected, and he it was who first brought Thom the sculptor, and Stephens the Ayr landscape-painter, into notice. He gave us a very interesting account of the progress of what the French would call *bienséance* among the people within the last forty years. Formerly the Ayr boys, on Sundays, used to conceal themselves near a church road by the sea-shore, and amuse themselves by throwing stones at persons returning from church. To such an extent was this carried, that many persons received severe injuries, and others were obliged to take a more circuitous route to church in order to go along a more public road. No such thing has occurred for a number of years past. Mr. Auld's grounds are open to the public the greater part of every day, and though some injury was done at first, yet scarcely any thing of that sort now takes place. When it does, it is chiefly by the higher classes, some of whom have been detected gathering flowers and taking cuttings of fuchsias and such like plants. Mr. Auld seems to be of the same opinion as Lord Francis Egerton, viz. that there is now much less danger from the lowest class than from those who are a step or two above them. (See *Times*, April 8. 1843.)

In Mr. Auld's grounds are many wild plants, particularly ferns, a dozen kinds having been found within as many square yards by the venerable Mr. Smith of Monkwood. The river abounds with salmon, and the woods with singing birds, more especially the thrush and the blackbird. The day being fine as well as the scenery, and other circumstances being favourable for enjoyment, we left the wooded walks, the roar of the waters, and the benevolent and liberal Mr. Auld with regret.

Newark Castle is the property of the Marquess of Ailsa, but is now occupied by Thomas M. Gemmel, Esq., the editor of one of the Ayr newspapers. We had heard much of this castle, as being of great antiquity, in good preservation, and as having had Queen Mary for a guest. It appears to have been built, or perhaps only repaired, in the early part of the seventeenth century. The entrance is at the bottom of an outside circular stair; the rooms are low, the walls thick, and the windows small, but there is no pretension to architectural finish or decoration. The roof is partially concealed by a parapet, and at one angle there is a projecting turret, with openings between the corbel stones, the arrangement serving in these days as the family water-closet, the family dunghill or refuse heap being probably directly below. The castle is high in proportion to its length and breadth, and is placed on a rock, in a commanding position, with a view of a considerable portion of country inwards, and of the sea coast, which is at a short distance. As a proof that it was a place of some consideration about the latter end of the seventeenth century, it is approached through an avenue of silver firs, a tree that was only introduced into England in 1603, and is not likely to have been so abundant in Scotland as to admit of its being planted in avenues for at least half a century afterwards. In the grounds, which are in a state of utter neglect, are a number of fine large specimens of silver firs, Scotch pines, ashes, and a sweet chestnut 23 ft. 4 in. round at the surface of the ground, and 18 ft. in circumference a little farther up. We could not help regretting that this place, which has so many advantages of varied ground, water, rocks, wood, distant prospect, and the shell of a house which will endure for ages, and might be filled with good rooms, should belong to a proprietor who has already several fine residences, and to whom a piece of farm land of equal annual value would, we should suppose, answer the same purpose. It is a pity that such a place is not let on lease, for such a period as would justify a tenant in improving and keeping it in good order.

On returning to Ayr by the coast road, we passed some fine specimens of *Sàlix* álba and *S.* frágilis, and some decent cottages and very indifferent gate lodges. Mr. Paton's cottage, and some others of an ornamental character, with tolerable front gardens, deserved a more minute inspection than we could give them from the road; but, on account of the day, we did not think it desirable to ask admission. The spire of the new church of Ayr, by Mr. Hamilton of Edinburgh, is generally considered the handsomest in Scotland.

Aug. 30. — We passed the day at Crosslee Cottage, with our friends Mr. and Mrs. Woodhouse, and in the evening set off for Edinburgh. We think it right to notice the extreme carelessness and incivility of the people at the Paisley station. When we arrived there from Liverpool on June 28th, the train would not stop sufficient time to take out our luggage, but carried it on to Glasgow, and nearly the same thing happened to us this time, having with great difficulty procured the luggage, which was not thrown down from the roof till after the carriage was in motion. On mentioning these circumstances to several persons, we found our case was by no means singular. If every one would notice such treatment as we now do, the evil would be remedied.

(To be continued.)

ART. VIII. *On Laying out and Planting the Lawn, Shrubbery and Flower-Garden.* By the CONDUCTOR.

(Continued from p. 177.)

BEFORE proceeding with our lists, we wish to offer a suggestion to the proprietors of pleasure-grounds and shrubberies, with a view to rendering these scenes more permanently interesting; and, also, in the present depressed state of the country, to the temporary employment of workmen.

The walks through shrubberies and pleasure-grounds in general, it must be acknowledged, exhibit a good deal of beauty, but, at the same time, a good deal of sameness. The ordinary mode of increasing their interest is by the introduction of buildings, seats, and statues, vases, and similar architectural and sculptural objects, together with baskets of rustic work. All these, when introduced in moderation and in appropriate places, produce the effect intended to a certain extent: but we would add to the variety, and consequently interest, of shrubbery and pleasure-ground walks, by the introduction along them, at various distances, of what may be called botanical episodes. For example, we would introduce near the walk, and connected with it by subordinate walks, such scenes as a rosary, a heathery, a rock-garden, an American garden, a garden of British plants, gardens of particular genera of shrubs or flowers, such as of *Ribes*, *Bérberis*, Spiræ'a, Cýtisus, *A'*ster, Dáhl*ia*, annuals, bulbs, a garden of topiary work, of embroidery, &c. At a certain distance from the house we would introduce a thornery, a salictum, a juniper garden, a garden of cypresses, of hollies, &c., and, where there was room, a pinetum, an oak garden, an acer garden, &c. Whether separate gardens of this sort could or could not be introduced, we would commence near the house an arboretum, scattering the trees thinly over each side of the walk among the other trees and shrubs, or on the lawn, and so arranging them as to extend over the whole length of the walk, whether that were half a furlong or two or three miles, taking care that every tree and shrub that formed a part of the arboretum was completely detached, so as to afford ample room for its growth and natural shape. We would also have every plant named. Where the shrubbery or pleasure-ground was not large enough to admit of a complete arboretum, we would introduce only as many species as could be well grown; and, even if that number did not amount to a hundred, it might include one species of most of the genera which constitute the British arboretum.

Where there was not extent sufficient for an arboretum, we would introduce what may be called an herbacetum, that is, a series of circles on each side of the walk, but at such a distance from one another as not to show many circles at a time, and in each circle we would plant the hardy herbaceous plants, annual or perennial, which illustrated one natural order or tribe. If we could not get in the whole of the orders and tribes, we would limit ourselves to such as were most ornamental. By means of this kind, together with architectural and sculptural objects, as already mentioned, the walks in pleasure-grounds might be rendered much more interesting than they generally are; for the conspicuously naming of plants, and the planting them together according to their natural affinities, seldom fail to create a taste for botany among those who are in the daily habit of seeing plants so arranged and named. Where no interest of this kind is taken by the ladies of a family resident in the country, it will frequently be found that the walk to which they give the preference is the public road. There they have a chance of seeing something new or exciting; but in the shrubbery, as they take no botanical interest in the plants composing it, they know all that they will see before they set out.

The great object, then, of these introductory suggestions is to lead to improvements which will render the pleasure-ground and shrubbery far more interesting than they have hitherto been, except in those places where something of the kind which we have been recommending has been attempted; as, for example, wherever rosaries, pinetums, American gardens, salictums, quercetums, thorneries, grass gardens, gardens of annuals, bulbs, &c., natural arrangements of herbaceous plants, or arboretums, have been planted. This kind of improvement, we are happy to state, is on the increase. Very much depends on the gardener; and we trust we shall have his cooperation, as he is, in truth, as much interested in raising the character of the garden and grounds under his charge as his employer.

We shall now give Mr. Ayres's lists for planting the flower-garden fig. 50. in p. 173. Mr. Ayres has given three lists: one for spring, consisting chiefly of bulbs and low-growing herbaceous plants, which come into flower from

January to the middle of May; one for summer, consisting chiefly of hardy annuals, which should be brought forward ready to transplant the moment the bulbs have done flowering and are removed; and a third for autumn, consisting chiefly of greenhouse plants, such as pelargoniums, verbenas, Lobelias, &c. Mr. Ayres has also given a list of roses for the sixteen square beds marked *d*, in each of which there is to be a standard rose.

I. *List for Spring.*

1. Blue Crocuses. Blue.
2. Anemones. Pale blue.
3. Anemones. White.
4. *A*lýssum saxátile. Yellow.
5. Hyacinths. Dark purple.
6. Ranunculus, Turban. Scarlet.
7. Crocuses. Yellow.
8. Heartsease. Variegated.
9. Tulips, mixed, common. Various colours.
10. Tulips, Royal standard. Various colours.
11. Hyacinths. White.
12. Tulips. Yellow.
13. Hyacinths. Blue.
14. Tulips, Duc Van Thol. Scarlet and yellow.
15. Hyacinths. Red.
16. Crocuses. Purple.
17. Heartsease. Variegated.
18. Tulips, mixed, common. Red, yellow, and white.
19. Ranunculuses, Turban. White.
20. Anemones. Pale blue.
21. Hyacinths. Dark purple.
22. *A*lýssum saxátile. Yellow.
23. Crocuses. Blue.
24. Anemones. White.
25. Ranunculuses, Turban. Scarlet.
26. Crocuses. Yellow.
27. Heartsease. Variegated.
28. Tulips, mixed, common. Red, yellow, and white.
29. Tulips, Gold standard. Red and yellow.
30. Hyacinths. White.
31. Tulips. Yellow.
32. Hyacinths. Blue.
33. Hyacinths. Red.
34. Tulips, Duc Van Thol. Scarlet and yellow.
35. Tulips, mixed, common. Red, yellow, and white.
36. Heartsease. Variegated.
37. Crocuses. Purple.
38. Ranunculuses, Turban. White.

II. *List for Summer.*

1. Clintòn*ia* pulchélla. Blue.
2. Clárk*ia* pulchélla álba. White.
3. Godèt*ia* bìfrons. Pink and white.
4. Yellow Wallflower. Yellow.
5. Nemóphila insígnis. Bright blue.
6. Nemóphila atomària. White.
7. Leptosìphon densiflòrus. Pale purple.
8. Godèt*ia* Lindley*àna*. Rose and white.
9. *E*rýsimum Perowski*ànum*. Deep orange.
10. Nolàna *a*triplicifòlia. Blue.
11. Collíns*ia* bícolor. Pink and white.
12. Gíl*ia* trícolor álba. White.
13. Gíl*ia* trícolor. White and purple.
14. Nemóphila insígnis. Blue.
15. Clárk*ia* pulchélla. Rose.
16. Collíns*ia* grandiflòra. Purple and blue.
17. Schizopétalon Wálker*i*. White.
18. Clárk*ia* élegans. Lilac.
19. Godèt*ia* rubicúnda. Purple.
20. Clárk*ia* pulchélla álba. White.
21. Nemóphila insígnis. Bright blue.
22. Yellow Wallflower. Yellow.
23. Clintòn*ia* pulchélla. Blue.
24. Godèt*ia* rubicúnda. Purple.
25. Nemóphila atomària. White.
26. Leptosìphon *a*ndrosàceus. Lilac.
27. Godèt*ia* *r*òsea álba. Rose and white.
28. *E*rýsimum Perowski*ànum*. Deep orange.
29. Nemóphila phaceliöìdes. Pale blue.
30. Collíns*ia* bícolor. Pink and white.
31. Gíl*ia* trícolor álba. White.
32. Gíl*ia* trícolor. White and purple.
33. Clárk*ia* pulchélla. Rose.
34. Nolàna prostràta. Blue.
35. *I*bèris umbellàtus. Purple.
36. Schizopétalon Wálker*i*. White.
37. Collíns*ia* vérna. Purple.
38. Godèt*ia* Romanzòv*ii*. Purple.

III. *List for Autumn.*

1. *V*erbèna *Melíndres*. Scarlet.
2. Crucianélla stylòsa. Flesh colour.
3. *V*erbèna *teucriöìdes* cárnea. Flesh colour.
4. Pelargònium variegàtum. Variegated.
5. Lobèl*ia* ramòsa. Blue.
6. Lobèl*ia* bícolor. Pale blue.
7. *V*erbèna Hendersòn*ii*. Purple.
8. Pelargonium, Frogmore. Scarlet.
9. Calceolària rugòsa. Yellow.
10. Lobèl*ia* axillàris. Pale blue.
11. *Petùnia* phœnícea. Purple.
12. *V*erbèna Barnès*ii*. Rose.
13. *V*erbèna, the Queen. White.
14. *Petùnia* hýbrida. Purple.
15. *H*eliotròpium corymbòsum. Pale purple.
16. Nierembérg*ia* filicaúlis. Lilac.
17. *V*erbèna Tweedie*àna* supérba. Scarlet.
18. Œnothèra Drummónd*ii*. Yellow.
19. *V*erbèna pulchélla. Pale purple.
20. *V*erbèna Buíst*ii*. Pale rose.
21. *A*nagállis Monéll*i*. Blue.
22. Pelargonium, variegated ivy-leaved. Variegated.
23. *V*erbèna ígnea. Scarlet.
24. *V*erbèna *teucriöìdes* cárnea. Pale flesh colour.
25. Campánula carpática. Blue.
26. *V*erbèna Bishóps*i*. Pale purple.
27. Pelargonium, Cooper's. Scarlet.
28. Calceolària integrifòlia. Yellow.
29. *A*nagállis Phillípsi*i*. Blue.
30. *Petùnia*, Lady Peel. Purple.
31. *V*erbèna Marryátt*æ*. Rose.
32. *V*erbèna *teucriöìdes*. White.
33. *S*enècio élegans plèno. Purple.
34. *H*eliotròpium peruviànum. Pale purple.
35. Œnothèra macrocárpa. Yellow.
36. *V*erbèna Tweedie*àna*. Scarlet.
37. Nierembérg*ia* intermèdia. Purple.
38. Tournefórt*ia* *h*eliotropiöìdes. Pale purple.

IV. *List of Standard Roses.*

Noisettes.
Aimée Vibert.
Bouquet tout fait.
Elizabeth.
Fellemberg.
Jaune Desprez.
Lamarque.
Lamarque à Cœur rose.
La Biche.
Luxembourg.
Ne plus ultra.
Victorieuse.
Bourbons.
Madame Desprez.
Gloire de Rosamène.
Prince Albert.
Emile Courtier.
Ida.

The plan for a flower-garden, *fig.* 63., occupies the same space as the design fig. 11. in p. 70.; and is surrounded by the same low wire fence, only 20 in. high, for the sake of excluding rabbits. The beds are supposed to be on turf, and there are a basin and fountain in the central compartment, and a vase on a pedestal in the centre of the two others. We sent copies of this design to different correspondents as before, and we now subjoin their lists.

List of Plants for the Flower-Garden fig. 63. By Mr. Ayres.

I. *List for Spring.*

1. Hepática tríloba, double. Dark blue.
2. *A*'rabis álbida. White.
3. Crocuses, yellow Dutch. Yellow.
4. Hepática tríloba, double. Dark red.
5. Hepática tríloba, double. White.
6. Crocuses, Cloth of Gold. Yellow and brown.
7. *A*'rabis *r*òsea. Red.
8. Omphalòdes vérna. Blue.
9. *A*nemòne nemoròsa. White.
10. Prímula vulgàris, double. Lilac.
11. Prímula Aurícula, border varieties. Various colours.
12. Anemones, double. Various colours.
13. Ranunculuses. Various colours.
14. Hyacinths. Various colours.
15. Hyacinths. Various colours.

16. Ranunculuses, double. Various colours.
17. Anemones, double. Various colours.
18. Prímula Aurícula, border varieties. Various colours.
19. Pulmonària virgínica. Blue and purple.
20. *D*odecàtheon Meàd*ia*. Lilac.
21. Omphalòdes vérna. Blue.
22. *P*hlóx subulàta. Red.
23. *A'*rabis alpìna. White.
24. Prímula vulgàris, double. White.
25. Hepática tríloba, double. Dark red.
26. Crocuses, yellow Dutch. Yellow.
27. Prímula vulgàris, double. Red.
28. Hepática tríloba, double. Dark blue.

II. *List for Summer.*

1. Nemóphila atomària. White.
2. Collíns*ia* grandiflòra. Purple.
3. Gíl*ia* trícolor. White.
4. Nemóphila insígnis. Blue.
5. Nolàna *a*triplicifòlia. Blue.
6. Leptosìphon *a*ndrosàceus. Lilac and white.
7. Nolàna prostràta. Violet.
8. Clintòn*ia* pulchélla. Blue.
9. Collíns*ia* bícolor. Pink and white.
10. Clárk*ia* pulchélla. Rose.
11. Eschschóltz*ia* cròcea. Orange.
12. Godèt*ia* bìfrons. Purple.
13. Clárk*ia* pulchélla álba. White.
14. Eùtoca víscida. Blue.
15. *L*upìnus nànus. Purple and blue.
16. *I*bèris coronària. White.
17. *I*bèris umbellàta. Purple.
18. Clintòn*ia* pulchélla. Blue.
19. Clárk*ia* élegans. Lilac.
20. Godèt*ia* ròsea álba. Rose and white.
21. *E*rýsimum Perowski*ànum* Orange.
22. Leptosìphon densiflòrus. Purple.

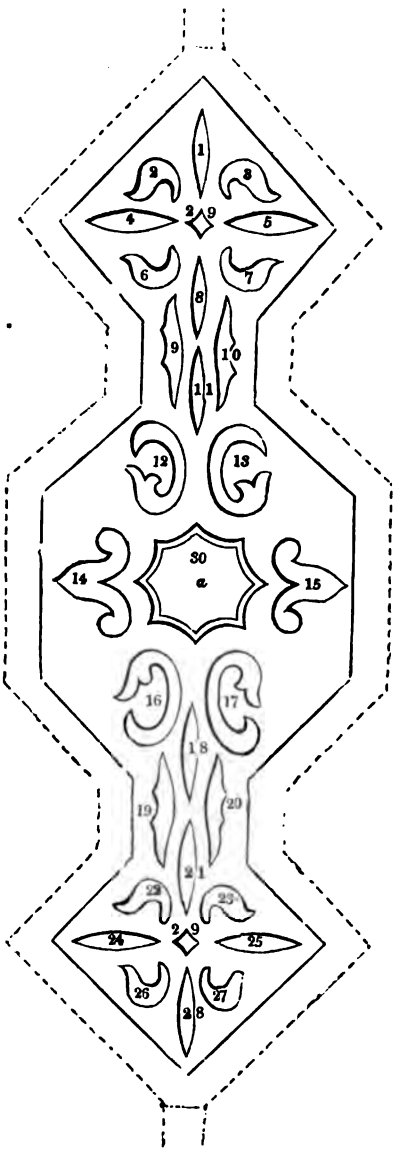


Fig. 63. *Flower-Garden with the Beds on Turf.*

23. Nolàna prostràta. Violet.
24. Nemóphila phacelioìdes. Lilac.

25. Nemóphila insígnis. Blue.
26. Gíl*ia* trícolor álba. White.
27. Collíns*ia* vérna. Purple.
28. Nemóphila atomària. White.

III. *List for Autumn.*

1. *V*erbèna ígnea. Dark scarlet.
2. Pelargonium, ivy-leaved. Variegated.
3. *V*erbèna Hendersòn*ii*. Purple.
4. Lobèl*ia* ramòsa. Blue.
5. Œnothèra macrocárpa. Yellow.
6. *V*erbèna purpùrea. Purple.
7. Pelargònium Manglès*ii*. Variegated.
8. *V*erbèna Chandlèr*ii*. Scarlet.
9. *V*erbèna, the Queen. White.
10. *V*erbèna Drummónd*ii*. Lilac.
11. *L*òtus jacobæ'us. Black.
12. Calceolària rugòsa. Yellow.
13. *Petùnia* hýbrida. Purple.
14. Pelargonium, Frogmore. Scarlet.
15. Pelargonium, Ingram's. Scarlet.
16. *S*enècio élegans plèno. Purple.
17. Calceolària integrifòlia. Yellow.
18. *L*òtus jacobæ'us. Black.
19. Nierembérg*ia* filicaúlis. Lilac.
20. *V*erbèna *teucrïöides*. White.
21. *V*erbèna *Melíndres* latifòlia. Scarlet.
22. *Petùnia* nyctaginiflòra. White.
23. *V*erbèna elfordensis. Purple.
24. Œnothèra Drummónd*ii*. Yellow.
25. *A*nagállis cærùlea grandiflòra. Blue.
26. Nierembérg*ia* intermèdia. Pale yellow.
27. Pelargonium, variegated. White.
28. *V*erbèna *Melíndres*. Scarlet.

List of Plants for planting the Flower-Garden, fig. 63. By Mr. Pringle.

1. Snowdrops as edging; the body of the bed of Moss ·Roses, dwarfs.
2. Hepática. Petunias, var.
3. Hepática. *H*eliotròpium peruviànum.
4. Double Primrose. Provence Roses, dwarf.
5. Double Primrose. Scotch Roses.
6. Crocus. Calceolària, var.
7. Crocus. *V*erbèna, var.
8. Snowdrop. Perpetual Roses, dwarf.
9. Narcissus. Select herbaceous plants.
10. Narcissus, or other Bulbs. Select herbaceous plants.
11. *G*enti*àna* acaúlis. *S*álvia fúlgens.
12. Nemóphila insígnis. Dahlias.
13. Lasthènia califórnica. Dahlias.
14. Dwarf Larkspur. Fuchsias.
15. Cladánthus arábicus. Fuchsias.
16. Collíns*ia* grandiflòra. Dahlias.
17. Gíl*ia* trícolor. Dahlias.
18. Prímula cortusö*ides*. *S*álvia pàtens.
19. *S*cílla, or Phalangiums. Select herbaceous plants.
20. *S*cílla, or other bulbs. Select herbaceous plants.
21. Snowdrop. Hybrid China Roses, dwarf.
22. Sanguinària canadénsis. Geraniums of var.
23. Adòn*is* vernàlis. Scarlet Geraniums.
24. Aurícula, var. China Roses, dwarf.
25. Polyánthus, var. Tea-scented Roses, dwarf.
26. *S*cílla bifòlia. *S*enècio élegans flòre plèno.
27. Erythrònium déns cànis. *L*òtus jacobæ'us.
28. Snowdrop. Noisette Roses, dwarf.

The centres of the two extreme figures may contain fancy baskets or vases for greenhouse plants in summer; and the centre *a* may be a basin and fountain, if there is water at command; if not, azaleas and other American plants, mixed with select standard roses. If the beds Nos. 2, 3, 6, 7, 22, 23, 25, and 27 were planted with American plants, the garden might then be kept at less annual expense of plants and labour; and this may be suitable for those who do not keep a sufficient garden establishment. — *J. P.*

List of Plants for planting the Flower-Garden fig. 63. By Mr. James Call, Foreman in Duncombe Park Gardens.

1. Lobèl*ia* fúlgens, and *L*upìnus nànus.
2. *M*ímulus of dwarf varieties.
3. Heartsease of varieties.
4. *V*erbèna Drummóndi*i*, and *V. Melíndres.*
5. Petunias of varieties, and *A*nagállis Monélli.
6. Eschschóltz*ia* califórnica, and *A*nagállis grandiflòra.
7. Alonsò*a* urticifòlia, and Clárk*ia* pulchélla.
8. Calceolarias of varieties, and Collíns*ia* bícolor.
9. Herbaceous plants.
10. Herbaceous plants.
11. Scarlet Geraniums, and *V*erbèna Tweedie*àna*.
12. Crássula coccínea, and Salpiglóssis pícta.
13. *S*álvia pàtens, and German Stocks.
14. Fuchsias of varieties, and *A*ntirrhìnum caryophyllöìdes.
15. Dahlias of varieties, and German Asters.
16. *S*álvia coccínea, and Dwarf Rocket Larkspur.
17. Hydrangeas, and *A*'ster *A*méllus.
18. Pentstèmon gent*ianöìdes*, P. fruticòsa, and Nemóphila insígnis.
19. Herbaceous plants.
20. Herbaceous plants.
21. *H*eliotròpium peruviànum, and Collòmia coccínea.
22. *Œ*nothèra Drummóndi*i*, and Nemóphila atomària.
23. *A*ntirrhìnum caryophyllöìdes, and Eùtoca víscida.
24. *V*erbèna Tweedie*àna* élegans, and *V. S*abìna.
25. Potentillas of varieties, and Schizánthus pinnàtus.
26. Heartsease of varieties.
27. *V*erbèna incìsa, and *V. Melíndres.*
28. Lobèl*ia* propínqua, and *C*onvólvulus mìnor. — *J. C.*

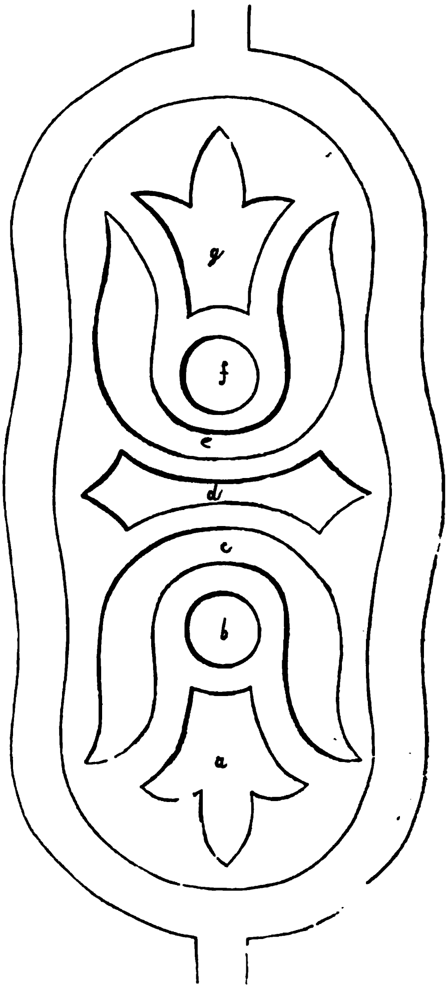


Fig. 64. *American Garden.*

Fig. 64. is a design for a small American garden, intended to form an episode in a shrubbery on the principle recommended in the introduction to this article.

a. American perennial herbaceous plants.
b. American bulbs and annuals.
c. American low flowering shrubs, such as rhododendrons, azaleas, kalmias, &c.
d. Magnolias.
e, f, g, Counterparts to *a, b, c,* but containing quite different species.

Fig. 65., is a design which may also serve as an American garden, or for a garden entirely of peat earth shrubs and plants, of whatever country they may be natives, which require to be grown in moist peat. The herbaceous plants may be planted in the beds 1, 4, 5, 8, and the magnolias and low shrubs in the beds 2, 3, 6, 7. The central circle, 9, is for a basin and fountain, from which there may be an underground communication to each bed, by means of small earthenware pipes, which can be plugged up at pleasure. This communication will admit of keeping the beds moist during the dry season, which contributes greatly to the beauty of all flowering shrubs, especially such kinds as the American Rhodoràceæ, most of which grow in moist peat.

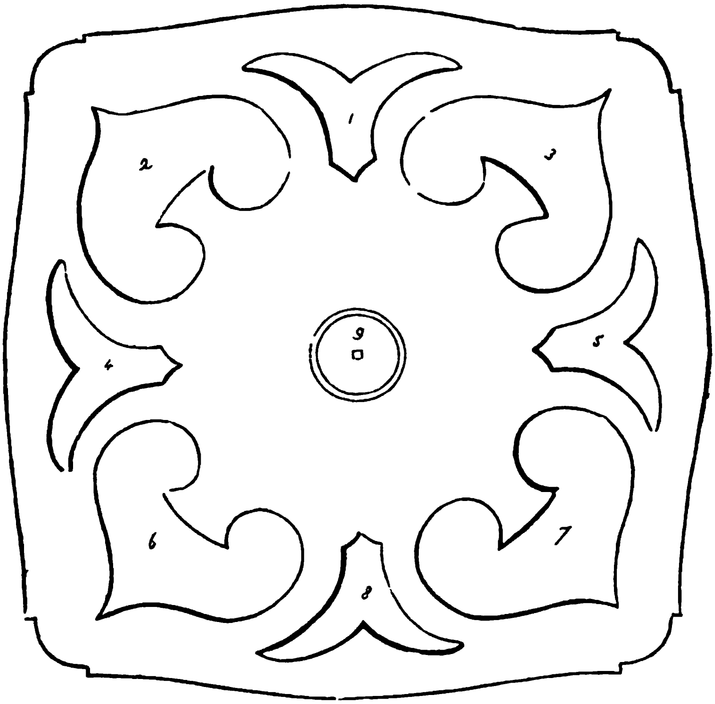


Fig. 65. *Garden of Shrubs and herbaceous Plants which require to be grown in moist Peat; the moisture being communicated by pipes connected with the central basin.*

Fig. 66. is a design for a garden, to contain a select collection of dahlias, to form an episode to a shrubbery walk.

The beds at *a a* embrace small basins of water, and in order to contrast with the others, may be planted with a collection of hollyhocks. The beds marked *b b* may be planted with evergreen shrubs, in order to prevent the

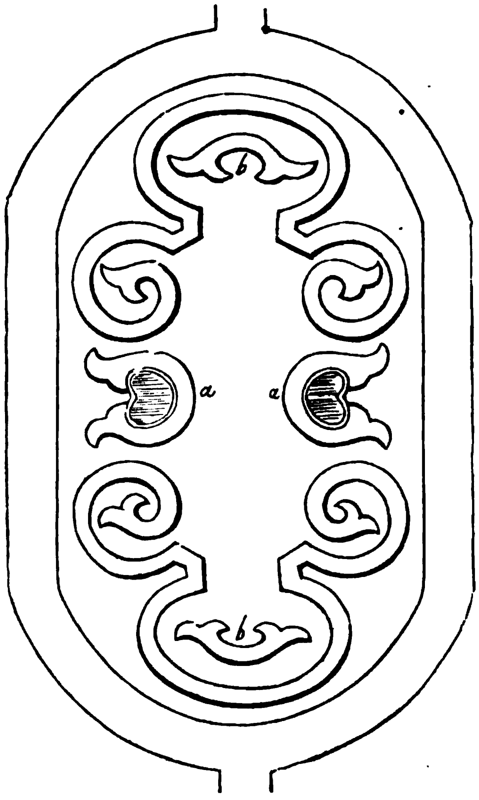


Fig. 66. *Dahlia and Hollyhock Garden.*

whole garden from being seen at once when entering. There may also be a few plants of *Cupréssinæ*, or other evergreens, sprinkled down the middle of the garden, from *b* to *b*, in order to form a background to the dahlias and hollyhocks; for this garden, like *fig.* 64., is one of those the beauties of which are to be seen in succession, and not at a single glance, as in the design *fig.* 63. The dahlia beds are so disposed as that every variety may be seen from the walk. The width of the beds is 3 ft., which will admit of two rows, the plants of one row alternating with those in the other. In order to preserve the exact form of the beds, they ought to have concealed brick edgings, formed in the manner shown in figs. 56, 57. in p. 217., or by triangular bricks made on purpose. The shapes may also be preserved by iron rods raised 6 in. above the beds, and securely fixed.

Art. IX. *Description of a Propagating-House heated by hot Water circulated in Brick Troughs.* By J. M. Lindsay.

According to my promise, I forward for your inspection a plan and section (*fig.* 67.) of a propagating-house in the Hammersmith Nursery, recently heated (by my employers, Messrs. John and Charles Lee) by hot water circulating in brick troughs lined with cement; top and bottom heat being produced by the same means. We have now had the plan in operation a sufficient time to test its merits, and I feel quite justified in asserting that it far surpasses every other means with which I am acquainted for the purpose of commanding a regular, steady, genial, and moist *bottom* and *top* heat; so much so, that I have not the least doubt that, when its superior advantages are fully known, it will ultimately supersede the use of all the fermenting materials which are generally used as a medium for bottom heat, and also the use of iron pipes for horticultural purposes.

The house to which the system has been applied here is fifty feet long and eight feet wide; it was originally used for propagation, but without the means of that useful stimulant for cuttings, &c., bottom heat, instead of which it had a platform of tiles three feet six inches in width, raised on brick arches, and running the whole length of the house, being of a sufficient height to make it convenient for placing pots of cuttings, &c., upon. The means of heating used was a common smoke flue, also raised on brick arches, and occupying two feet in width; the remaining space was taken up by the path.

All that was found necessary to do in altering it to its present state, after procuring a boiler, was to pull down the smoke flue, which was next the front wall, and make the bench on which it stood on the same level with the platform on the other or back side of the path; this done, two troughs were erected upon it for heating the atmosphere of the house, as represented in *fig.* 67. at *b b*. These troughs are formed by partitions two bricks on edge deep, set in cement, the bottom and inner sides of the lower bricks only being plastered with the same material. A covering is formed of common tiles, which were in use for covering the smoke flue. On the three feet six inches platform are also erected two troughs (*d d*), as a medium for bottom heat. They occupy its full width, but are only formed one brick on edge deep (*d d*), also set in cement, and plastered with the same inside. Common plain tiles (as they are termed) are used for a covering for these troughs; but, as they are only nine inches in length, it was found necessary to support the end of each in the middle of each trough by means of a row of brick on edge laid in without cement, so as not to raise them above the level of the side bricks, and left pigeon-holed. The tiles were then bedded on in cement, all the joints being afterwards carefully pointed. This forms another platform, which is covered by about six inches of old tan for receiving pots of cuttings, &c., which tan is kept compactly together by a brick on edge, also set in cement along each side, as shown in the section.

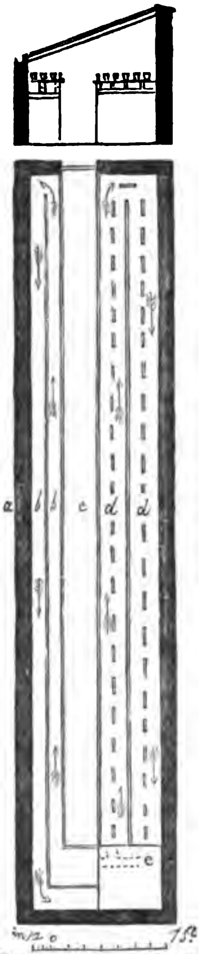


Fig. 67. *Plan and Section of a Propagating-House in the Hammersmith Nursery, heated by hot Water circulating in Brick Troughs lined with Cement.*

The boiler is placed at the extreme end of the house at *e*, inside, being supplied with fuel from the outside; it has a short piece of four-inch iron pipe to supply the two flow troughs, as represented by the dotted lines at *e*, and two return pipes which enter it at opposite sides. This boiler is of novel construction, the invention of Mr. Thomson, late gardener at Syon House, and is well calculated for economy, both in fuel and labour; having a much greater surface exposed to the action of the fire than any boiler I have ever seen of the same size.

The water in the troughs rarely exceeds an inch in depth, with which quantity we can keep, with the greatest nicety, both the temperature of the house and the bottom heat to any required degree. I must not omit to mention, that in each flow trough is placed a sluice, formed by a piece of slate pushed down in two grooves in the cement, so that the water may be stopped from circulating in either at pleasure.

So satisfactory has the system proved here, and so very moderate in expense, a bricklayer and his labourer having completed the whole in a few days with two and a half tubs of cement, the old materials which formed the smoke flues being found sufficient for the alteration, that my employers have determined on heating a large orchidaceous house, and also one for cacti on the same principle. The troughs in the latter house will be supplied by the boiler in use for the above propagating-house.

I believe that Mr. Beaton, gardener to Sir W. Middleton, Bart., at Shrubland Park, was the first that used brick troughs for heating the interior of horticultural erections; he published a detailed account of it in the *Gardener's Chronicle* for 1842, p. 348., and it has since been adopted in various parts of the kingdom. Hot water has also been in use as a medium for bottom heat, for many years back, in different horticultural establishments, but upon modes much less economical than those above described. To those who do not wish for the expense and litter of fermenting materials as a mode of producing heat, I can safely say that the *trough system* of heating offers great advantages.

Hammersmith Nursery, March, 20. 1843.

ART. X. *On the Superiority of Span-roofed Greenhouses.* By JAMES M'NAB, Superintendant of the Caledonian Horticultural Society's Garden.

AT the last meeting of the Caledonian Horticultural Society, Mr. James M'Nab, the curator of the Society's Experimental Gardens, made an interesting communication, showing the superiority of plant-houses extending north and south, and having a span-roof fronting east and west, over such as have only an inclined roof fronting the south, commonly called by gardeners *lean-to* houses. This superiority holds good both in summer and winter, but is particularly remarkable in the latter season.

For example, in a span-roofed house, extending north and south, during the stormy weather of winter, air can be freely admitted, from whatever direction the wind may blow, there being always a lee side where sashes can be opened. In frames and pits, where top air alone can be given, plants suffer greatly from damp; but in a span-roofed house, the circulation of air may be constantly kept up so as effectually to prevent damp. For such a greenhouse, fire heat is scarcely at all required; for, if there be a free circulation of air during the autumn and winter months, and if the tables or shelves be carefully kept dry and clean, and water be sparingly given to such plants only as require it, cold, even though it should extend to the occasional freezing of the surface soil of the pots, will do less injury to most plants than the application of fire heat. Mr. M'Nab has found the same kind of plants to become soft, spongy, and drawn up in the lean-to house, which continued hard, woody, and dwarfish in the span-roofed house. Last season he kept a number of fine cinerarias and geraniums in houses of both forms. After a severe frosty night in January, they presented in the morning much the same appearance in both houses; the leaves drooping, and being covered with a white rime, resembling hoar-frost. By ten o'clock the sun shone forth. The plants in the *lean-to* house were subjected to the full influence of the mid-day rays; and, although air was given, they blackened and perished. In the span-roofed house, extending north and south, the influence of the sun was much less felt; for, as he proceeded towards the meridian, the intercepting astragals and rafters necessarily formed a screen or shade; and, air being given, the plants survived, and soon recovered.

Amateur cultivators who like to possess a small greenhouse, and to manage it for themselves, ought to prefer the span-roofed form; and from Mr. M'Nab they may learn this important lesson, that, by an early and anxious application of fire heat, in a frosty night in the beginning of winter (a common fault), they not only incur unnecessary trouble and expense, but do real injury to their plants, which would suffer little from cold, provided air were made to circulate freely among them, and damp were guarded against. The beautiful tribes of *Erica* and E'pacris will suffer little or nothing in a cold greenhouse, although the thermometer in the open air may indicate several degrees below freezing; while the sudden application of fire heat will probably kill them.

Mr. M'Nab mentioned that the superiority of the span-roofed form was strikingly exemplified in the Society's garden about the middle of February last (1843), when the self-marking thermometer in the open air, during different nights, indicated 20°, 15°, and even 10° Fahr. During these frosts no heat whatever was applied to the span-roofed house, which contained a general collection of soft and hard wooded greenhouse plants. On the mornings of the 17th and 19th of February, the mercury in the thermometer within the house stood at 25°, or seven degrees below freezing; yet only two or three plants which were standing near the upright glass of the south end of the house, and were thus exposed to the mid-day sun, suffered from the intense cold to which they had been subjected. The temperature in the span-roofed house always remained much more equable than in the lean-to house. This was signally remarkable at 1 P.M. of the 14th of February, when the thermometer in the open air indicated 56°; in the lean-to house 70°; and in the span-roofed house 43°: in the lean-to house, therefore, where the whole glass roof was fully exposed to the sun's meridian rays, the temperature thus becoming fourteen degrees higher than the open air, and twenty-seven degrees higher than in the span-roofed house.

Having enlarged on the advantages of this form of greenhouse during winter, we shall only briefly state, in conclusion, that, in the warm weather of summer, the span-roofed house admits the freest possible circulation of air, by means of upright sliding sashes on both sides of the house; while the rafters and astragals of the glazed roof break and intercept the sun's rays, and help to shade the plants from their direct influence; and that in such a house the plants, instead of being drawn up and weakly, continue firm and bushy; that they remain much longer in flower; and that the colours of the flowers are generally brighter. (*Edinburgh Advertiser*, April 11. 1843.)

ART. XI. *Arboricultural Notices.*

F*A'GUS antárctica*, Arb. Brit. p. 1982., and E. of Trees and Shrubs, figs. 1702. and 1703. p. 910., has been introduced from Tierra del Fuego, by Dr. Joseph Hooker, and there are plants at Kew, and in Mr. Knight's Exotic Nursery.

Ribes *Beatònii*, a hybrid raised by Mr. Beaton, between *R.* sanguíneum and *R.* aúreum, is now beautifully in flower in Lee's Nursery. It is a vigorous-growing plant, with long racemes of flowers, partaking of the colour of both species.

Magnòlia Alexandrìna, a hybrid between M. conspícua and M. purpùrea, or perhaps M. p. grácilis, one of the most desirable of deciduous magnolias, was in full flower in Lee's Nursery on April 1st, when not a single flower bud of M. Soulang*eàna* was expanded, and when M. conspícua was just going out of bloom. Thus, by having plants of these three kinds, a succession of bloom will be kept up from the first week in March to the first week in May.

ART. XII. *On a Mode of growing late Melons.* By B.

AGREEABLY to promise I now attempt to send you an account of my method of growing late melons, which, as I have practised it with complete success for the last three seasons, I think may be acceptable to at least some of your readers. The last three summers have been so different in temperature and moisture, that I think I may reasonably conclude the change of season will not affect my plan. I do not mean to dictate to any one the precise time for sowing their melon seed, making their beds, or planting their plants; all this must depend on the circumstances under which they are placed, for, if I were differently situated, I should very likely be obliged to vary somewhat as to time, &c.; but my object is to show that a good crop of melons may be obtained, with greater certainty, at a less expense than is generally supposed, and of superior flavour. As regards the latter you can speak from experience, from one sent you late in the season. [See J. B. in p. 84.] As regards the quantity, owing to the state of my health last autumn, I could not attend to the cutting of them myself, and therefore a strict account was not kept; but generally not less than ten to a light are produced. As to the expense, some may think it no object where they have plenty of soil and a convenient cart road into the melon ground, but not so with those who have not soil, nor are allowed to purchase it, or who have but few hands, and a long distance to wheel; to such the expense and labour form an object of importance.

Having plants in readiness, I proceeded last year to make my beds on the 30th of June. The materials consisted of leaves which had lain in the melon ground since the autumn, some old dung from pit linings, in a mouldy, not wet rotten state, and some fresh long dung to make up the deficiency. I do not like the dung to be sufficiently wet at this time of the year to cause it to rot and become solid, as it will then be of little use in the autumn, when its assistance will be more required. With the above kind of materials the bed was made, without any regard to their being sweet. In making all kinds of dung beds, my practice is to have the ground they stand on much lower in the middle than on the sides, and, where necessary, to have a drain underneath the whole length. I then build them up, and finish the top in the same form, as I find they are not so liable to fall at the sides, splitting the soil of the bed, breaking the roots of the plants, and rendering it necessary frequently to raise the frames. The beds being made for our present purpose about 3 ft. high, I immediately put on the frames, each light being about 4 ft. 2 in. wide, and 6 ft. 5 in. long. In consequence of the green dung used in the beds, they will of course heat very rapidly, and, owing to the power of the sun at this season of the year, the heat in the frame will be very great; and by keeping it shut up for some days every insect must perish, and the beds will have heated themselves into such a dry state that there will be no danger of overheating afterwards. When the heat has sufficiently subsided to render it safe to put in the soil, the frames are taken off and the beds regulated, still keeping them hollow along the middle. A ridge of the best loam in a rough state is then laid along the middle, and pressed firm, about 15 in. deep, and about as wide on the top, drawing what rolls down all over the bed, so as scarcely to hide the dung, more for the sake of making it level enough to set pots on than any thing else. If there is any danger of wire worms in the soil, I find it a good plan to place some potatoes where the plant or plants are to go. Sometimes I put one plant, sometimes two. When the earth is warm enough, let the plant or plants be placed under the middle of each light, and one shoot be trained towards the back, one towards the front, and one each way along the ridge, stopping them when they reach the frame, or under the bar between the lights. Let the potatoes still remain planted all round the plants, as they will almost always attract the wire worms; and as they will show, by growing, where they are, they may be taken out and examined, till the soil is cleared of them; at least I have never known it fail. Before the frames get crowded, add about 3 in. more soil all along the sides of the ridge, and press it firm; but add no more all the summer, and let the plants fall down as they extend, and cover the dung in front of and behind the ridge.

Perhaps some may think it would be better to fill the frame with soil, but from such I must beg leave to differ, and for this reason. For several years I was taught to believe that, in order to have good melons, it was necessary to watch the roots in their progress through the hills, after each earthing, till the frames were filled with soil; and many a time have I had to place fresh layers and beat it firm, and at last, when full, to get in and tread it firm, thereby rendering it so hard that the portion of water allowed could not get down, and the little heat remaining by the time the earthing was done could not get up ; the consequence of which was, that the atmosphere at top must be cold and damp, and very unlikely to produce a good crop of melons : but my present plan will be free from these objections, as, by leaving the space in front and back of the frame uncovered, there will always be a warm moist atmosphere produced, so long as watering is necessary ; and when the cold nights and gloomy days of autumn come on, the dung of which the beds are composed having become dry will, if linings are necessary, afford a warm dry atmosphere to ripen the fruit. But perhaps some one will be ready to say, Will not the dry mouldy kind of dung very much harbour insects which will eat the melons, especially such as are commonly known by the name of sow bugs ? To this I reply, I have never been injured by them to any extent ; for, if I find many of them in the frames, I merely put a little hay into a few flower-pots, turn them upside down, sprinkle the frame round, and next morning, soon after uncovering, examine the pots, when most of them will be found concealed above the dry hay in the pot. There should never be sufficient hay in the pot for any portion of it to touch the bed, otherwise the insects will remain on the dung instead of climbing the pots. But, in order more safely to guard against these depredators, my plan is, after a melon is set, to raise it on a flower-pot inverted, with a piece of glass on the top, larger than the flower-pot, so that if they crawl up to the glass they will crawl down again, instead of continuing their course on the under side of the glass, which is the only way they can get to the fruit, except by the stem on which it grows, and being a considerable distance from the ground I never knew them succeed by this route.

I believe I have now stated all that is necessary, except that I had melons from these beds from August till late in November, and that I never prune melon plants if possible to avoid it, as I have often seen a good crop spoiled by it ; and, if melons are kept continually swelling in succession, the plants will generally have enough to do to support them, without producing too much vine.

Middlesex, April, 1843.

REVIEWS.

Art. I. *The Country House (with Designs).* Edited by Lady Mary Fox. 4to, pp. 65, with 5 lithographic plates, and many vignette woodcuts. London, 1843.

The idea of this book is good. A gentleman is about to build a house, and he enters previously into the discussion of the subject with his architect, who residing at a distance, the discussion is naturally carried on by letter. The letters of the gentleman intending to build are signed H. B. (understood to be Henry Bellenden Ker), and the architect is M. de Châteauneuf of Hamburg, the author of *Architectura Domestica* (reviewed in our Volume for 1839, p. 703.). In addition to the letters of the architect and his supposed employer, there is a valuable one by Mr. Eastlake, the eminent artist, on the principles of interior decoration. We shall endeavour to abstract what we consider as bearing on general principles, and afterwards give our opinion of the design.

In Letter I. the employer states that he consults the foreign architect from great respect for his talents, and because he is "not likely to be so much wedded to the routine of modern Italian villas, Elizabethan houses, and thatched cottages, as is the case with most of our English professors." He next hints at the sort of house he wants, and gives a short description of the proposed site. "With respect to the offices," he says, "I think we make a great mistake in England, as we manage to hide them, and lose all the benefit of increasing the size and importance of the house by these additions." This remark may have been applicable thirty or forty years ago, but no architect of the present day thinks of concealing the offices of a country house, unless under very peculiar circumstances. In Price's *Essay on Architecture and Buildings*, published in 1798, the following passage occurs: — "Much of the naked solitary appearance of houses is owing to the practice of totally concealing, nay, sometimes of burying, all the offices under ground, and that by way of giving consequence to the mansion; but though exceptions may arise from particular situations and circumstances, yet, in general, nothing contributes so much to give both variety and consequence to the principal building, as the accompaniment, and, as it were, the attendance, of the inferior parts in their different gradations." (*Price on the Picturesque*, edit. 1798, vol. ii. p. 215.)

In Letter II. the architect observes that sixty years ago no one would have thought of proposing to an architect to consider what style was most suitable for the intended situation and purpose. Every architect then, he says, adopted the style in general use, modified by his own particular views of that style. When the Italian mode was prevalent, no architect would have ventured to introduce the Gothic, &c.; but now we recognise and adopt various styles indiscriminately. "We seem to be of opinion that variety of character is attainable only by variety of style," and hence our museums are Grecian, our churches Gothic, and so on. "The adoption of a style previously discarded, though it may suit the vitiated taste of the artist, yet it can never be pleasing to a really cultivated taste." (p. 6.) The contrary of this principle is so obvious, that we think there must be some mistake in the translation; indeed, there is much in this letter that is obscure. Was not the Grecian style itself at one period discarded? The following, however, is good. "The most perfect architectural style is that which admits at the same time of a refined style, both of sculpture and painting." "Sculpture and painting," M. de Châteauneuf observes, "are the daughters of architecture, not, as is commonly said, the sisters; and it is only in the Italian style of the 15th century, that we meet with all the three arts growing up to completeness together." (p. 7.) The Greek style as modified in the Italian is what the architect proposes to adopt; "but, at the same time, with a reserved right to the free use of those modes and motives with which later European architecture supplies us. If a determinate name must be given to the style, I propose to call it the Renaissance style of the 19th century."

To the admirers of Gothic architecture he says, "If you can introduce modern sculpture and painting into Gothic architecture, without prejudice to them or it, I will say that you have attained a great end." In answer to those who imagine that he intends to produce a medley of Grecian and Gothic, he has the following excellent passage: "You misunderstand or pervert my meaning. I have not spoken of a merely mixing up of different styles, but of compounding them together; between which two processes there is, I conceive, a wide difference, the ingredients being merely put together in the one case, without losing their respective qualities; while in the other they amalgamate with each other, and produce an entirely new combination; and it is in accomplishing combinations of this kind that the power of genuine art manifests itself; and the distinction may be likened to the difference between a mechanical and a chemical combination." (p. 9.)

Letter III. — In this letter, as well as in his first, the employer shows a predilection for the comforts of the Elizabethan style, but admits the merits of the classical style in the abstract, and more especially as adapted for displaying sculpture and painting. He endeavours to ridicule the works of modern English architects. " Show me a Palladian villa," he says, " a mile off, and I could draw you the plan of the inside at once. Indeed, I could walk blindfolded into the drawingroom, dining-room, library, and boudoir, and go up to bed in the best bed-room, without a guide or a light."

In Letter IV. the architect makes some further observations on style. " The Elizabethan style is only one of the links of a progressive series of attempts to appropriate and adapt the elements of the Grecian style to modern purposes. You must, therefore, admit that architecture, which is capable of producing independent works out of its own resources, and from its own principles, is degraded to what is little better than mere decoration and scene-painting, when (apprehensive of falling into contradiction and want of harmony, unless it retains all the individual particulars of extant examples,) it timidly strives to imitate the dialect of a single province. How short a time, however, must the impression produced by such mummery last, and how long the impression of a work of architecture is destined to remain! Is it because we are ashamed of or mistrust the results of our own study and conviction, that we venture to exhibit ourselves to posterity, merely as the copyists of examples the repute of which is already established, and which may be learnt and repeated by rote? At various periods, men have shown themselves either barbarous or puerile in their notions on art; yet never till now such slavish copyists, such mere plagiarists, such mocking-birds in style. You may judge by this sally in what an ill humour I am, at finding that you would shut me up in a cage and there make me sing. If you examine your Elizabethan architecture with some little critical attention, you will hardly fail to perceive that, with all its richness of expression, the elementary sounds are no more harmonious than the crowing of a cock, or the braying of an ass.

" All this concerns merely the style, as style; for, in other respects, we often meet with much [in the Elizabethan style] that deserves praise; convenient arrangement and contrivance, striking effect, and much cleverness of construction and execution, although, so far from being pure or refined, the taste displayed may be decidedly vulgar and coarse. I freely confess that the merits I have just mentioned were retained in the architecture of the North of Europe during the 16th and 17th centuries. I say retained, because the Gothic style that was then abandoned had been treated with masterly skill, and showed disciplined artificers in all that belongs to mechanical execution; consequently, the ability thus produced had only to employ itself upon a fresh task." (p. 18.)

With respect to the suitableness of the Greek style for modern purposes, our architect observes: " If we allow that, as far as it procceded, Grecian architecture is stamped by perfect beauty, it is of little moment to our argument whether it was so comprehensive as it might have been, and had sufficiently developed itself for those purposes which we now more especially require, since the perfection it did actually attain in the direction it took ought to be sufficient to inspire the artist. It was not necessary that the latter should surrender up the freedom belonging to him as such, and confine himself to following Grecian motives and intentions. In fact, the peculiar charms, or the grace and freshness, of Grecian architecture become withered, as soon as we begin to treat it according to dry systematic rules. The Vitruvius capable of legislating for it according to its genius and true spirit, perhaps is not yet born." (p. 19.)

In conclusion he observes, with respect to the style which he means to adopt for H. B.'s country house: " I do not mean to be confined either to a servile imitation of a pure Pompeian house; or to be tied down to repeat your Elizabethan architecture, or the Gothic of Germany or England. Nor do I propose to give you a fac-simile of any building of the Renaissance school. To the best of my power, I propose (as the best style) that which adopts the pure broad principles of beauty in building, and which were, I sincerely believe, best propounded by the Greeks; and which all experience has shown to be the best suited to receive addition from the highest style of painting and sculpture; and which are, in fact, parts of architecture. How far I may succeed is another point." (p. 22.)

Letter V.—General observations by the employer ridiculing modern practices.

Letter VI.—The employer describes the site, and the accommodations required, more in detail.

Letter VII.—The architect, speaking of architectural treatment and character, has the following passage:—

"Nearly all productions of architecture, more especially structures adapted for habitation, offer one side stamped as the principal or front, and another, which is its reverse; in which respect they bear a greater analogy to living beings than to plants; the latter having no definite fore side, on the contrary, any part becoming the front that is towards the spectator. Such being the case, the same rules that are to be observed for displaying a statue or representation of a living figure to advantage ought to be attended to in regard to the position of buildings." (p. 31.)

He proposes to form an artificial lake, and erect the house immediately on its north shore. "I need hardly point out to you the unusual agreeableness, and even *piquant* effect, of a residence so situated; and when I send my plans for the house itself, you will see what are the apartments that will occupy this side of the building, and what a charming prospect they will command of the lake immediately below, and the grounds on its opposite banks. At present I will only remark, as regards the increased effect thus to be gained, that a building immediately on the edge of a piece of water appears more considerable than in any other situation; and that the reflected image of the architecture will form a brilliant contrast to the darker reflections of trees and foliage. Besides which, the most favourable point of distance for viewing the building itself on this side would thus become fixed, being that from the opposite bank of the lake.

"A very cursory examination of the plan of the ground will convince you that the whole of the buildings you require are massed together in one group. Such an arrangement certainly contributes to convenience; and I agree with you that, by showing the various offices, instead of attempting to mask or screen them, the house itself may be made to possess greater importance and apparent extent; that is, you will get a large-looking country house at a small cost. It may be further remarked, that, by adopting such treatment of the plan, some kind of architectural foreground is introduced into the prospects seen from the house itself, together with much contrast and variety, and that, too, without incurring unnecessary or extra expense, since the same accommodation must be provided. Another advantage is, that the subordinate buildings of this kind, attached to the main structure, may be made use of as a kind of connecting link between the more artificial and studied regularity of the latter, and the natural objects in its immediate vicinity; without which sort of intermediate transition a house is apt to have the appearance of a mushroom structure that has over night started up out of the ground." (p. 32.)

Letter VIII.—The architect explains the design in detail.

Letter IX.—The employer objects to having a house "actually bordering on still water."

Letter X.—The architect describes the interior.

Letter XI.—The employer addresses Charles Lock Eastlake, Esq., R. A., &c., reminding him of his promise of advice, and acknowledging the kindness with which he devoted much time and labour to the "designing and executing" for him the "Pompeian room so deservedly admired."

"I never think on the subject without calling to mind the principles laid down for the ornamenting of a country house, in Mr. Rogers's 'Invitation to a Friend:' indeed, looking to his intimate knowledge of the whole circle of fine arts, and, lastly, the specimen of refined taste which his own town house exhibits, my *beau idéal* is a house decorated under his direction; but, as this cannot be obtained, I trust that you, who possess so much of his spirit and refinement, will, as far as may be compatible with your engagements, afford me the benefit of your assistance." (p. 51.)

Letter XII., by Mr. Eastlake, is, in our opinion, worth more than all the rest of the volume, because it lays down in the clearest manner principles either self-evident or reasonable.

The word decoration, however appropriate to fantastic ornaments, and in some degree to insulated figures, has been considered vilifying when applied to works that are addressed to the mind. We must be content to use it in both meanings; remembering that no work of art, however elevated, can dispense with the appeal, impressive or winning, to the eye.

As a general principle, the eye should be solely or chiefly addressed where a passing glance only can be given to the work; and the attention should be more taxed where leisure and surrounding circumstances permit or invite contemplation.

In art, the augmenting excellence ascends from sense to thought; but the indispensable condition is, that a gradation should still be maintained.

Halls. In the pavement of halls, the forms and hues employed should be merely calculated to gratify the sight; mosaic histories under the feet are therefore objectionable. A pavement, however decorated, should still express the characters of firmness and solidity. The lowest kind of life, even that of plants, and every approach to perspective, should be banished. Geometrical forms are alone admissible: their variety is infinite; but, even here, abrupt and irregular contrasts of colour should be excluded, because they have sometimes the effect of making the evenness of the surface doubtful. The same remark will apply in the case of carpets and oilcloths. These principles harmonise with those laid down by Pugin, as quoted in our *Supplement* to the *Encyclopædia of Cottage Architecture*, pp. 1283—1285.; the difference between the two authors being, that the one is guided by feeling and reason conjoined, and the other (Pugin) chiefly by feeling.

Door Sills. The ancients placed inscriptions on the threshold of the principal door of the house (salve), and sometimes even on the mosaic floor of the entrance to bedrooms (bene dormio); but

Letters are only ornamental in architecture when disposed symmetrically, and enclosed in a regular framework.

Statues have the advantage of being seen in various points of view, and thus command attention in situations where paintings could not. Bas-reliefs recommend themselves from their rich effect, and, like statues, are naturally connected with the classic materials of marble or bronze. In general, architecture seems to acquire additional solidity by the presence of sculpture. Works of sculpture, of the first excellence, should be admitted to the library or drawingroom. In the hall, mixing mural painting and sculpture is not advisable, because the former competes injudiciously with the latter, that is, with bas-reliefs. When there are statues or pedestals in a hall or corridor, decorate the walls with arabesques.

In the *staircase* employ either sculpture or painting, not both; the latter is preferable; but the decoration should be entirely subservient to the architectural effect. A great display on the walls and ceiling of a staircase might be defended on the ground that a mere passing impression of magnificence is intended; but they generally destroy the architectural effect. Whatever may be the subject of a painting on a staircase, it should appear to grow out of and complete the architecture. The introduction of painted figures of the size of life on the walls of staircases, or, indeed, anywhere else, where living figures must often come in contact with them, is in the very worst taste. The entire surface of the wall ought not to be covered, because that would destroy its character as a wall; and, therefore, the boundaries of the panels ought neither to extend to the angles nor the ceiling, but leave enough at these places to show that the paintings only covered compartments, and were intended to ornament the wall, not to conceal it.

Dining-rooms, "strictly so called and employed, are generally unadorned with pictures: this hardly seems necessary. In theory, we may admit that subjects requiring some contemplation would be out of place in a room exclusively devoted to 'the table'; but portraits of celebrated individuals, and landscapes, although they cannot be duly examined in such moments, may convey associations, to which the spectator, even if not particularly conversant in pictures, is supposed to be alive at all times. Portraits of the class alluded to, as historic texts, are connected with *time;* and landscape, especially if founded on actual scenes, suggests the conditions of place. A room used for the purpose in question, and for nothing else, is, however, not the place where fine works of art should be bestowed; and I incline to think that this is the fittest field for small frescoes and arabesques. This, in short, is one of the occasions to please the eye and the imagination only. Accordingly, in the mode proposed, no definite idea is presented to the mind, but an idea of elegant and festive splendour surrounds the guests. There should, however, be endless variety; scarcely a form should be repeated in the details, although an architectural symmetry is, as usual, to be preserved in the masses." (p. 57.)

The Breakfast-room. Where a family betake themselves to particular rooms at stated hours, it may be allowable to decorate and furnish these rooms in such a manner as to insure a marked and agreeable variety of character. "The morning has its own feelings, even for those whom affluence frees from any kind of labour. The purposes of the day are unfinished; every thing is contingent. Under such circumstances, the character or subject of pictures is to be adapted to the mind, not the mind to the subject. The open face of nature, by sea and land, may here enliven the walls, and agree with the excursive feelings of the hour. The chase and its incidents may here triumph. The English pastoral is here strictly in its place. Solemn themes, solemn effects, should not be admitted; while all that responds to buoyancy of spirit would, on the contrary, be appropriate. It need not be gravely objected, that accidental, or even average, states of feeling may be little in unison with the impressions which the arts profess to give; for the same objection is frequently applicable to all of the accompaniments of civilised life, nay, to the beauties of nature, which so often appeal even to cultivated human sympathies in vain. The occasional contradiction is unavoidable where, of two conditions, one is permanent, the other mutable." (p. 58.)

Corridors and Conservatories. Corridors not furnished with pictures, and garden pavilions, may be decorated with arabesques; but not so conservatories, where the conventional forms and tints of art would contend injudiciously with nature.

Frescoes are not adapted for sitting-rooms, because in general they require to be of a large size, and, being fixed, they cannot afford that variety which is produced by a number of small pictures, which may be changed at pleasure.

The Library. In libraries pictures of extensive interest divert the attention from the business of the place; but portraits may be admitted, and the library is the proper place for cabinets of gems and medals, collections of engravings, terra-cottas, &c. "I prefer a library without coloured decorations; the wood-work may be carved in flat relief, even to the panels of the walls; a mode of decoration now beautifully supplied by embossed leather, which need not be dark in colour. Whatever colour appears, except in the portraits, miniatures, or illuminations, hung around, should be in the books; these should strike the eye, and be, so to speak, in the foreground of the picture. Vases or busts may surmount the cases.

"I see no objection even to inscribing both the subject and the name of the master under works of art generally; a volume bears its title and author's name; and pictures, to many, are as sealed books, till enquiry is stimulated or interest quickened by similar means. When the description is too long to admit of this, the words 'See Catalogue, No. —.,' might be added.

" If colour is admitted anywhere in the library, it might be in subjects on the ceiling, allowable here, if at all, in the region of easy chairs and occasional meditation; perhaps too, to a certain extent, in the windows. The introduction of subjects on ceilings has not been recommended generally, but in the system of arabesque painting the universal decoration of the walls requires to be carried into the ceiling. Sculpture, from the reasons already given, or rather in accordance with the same taste, is quite admissible in the library." (p. 60.)

The Drawingroom.—The principal drawingroom, as that most occupied in hours of calm seclusion and leisure, is the proper place for the choicest works of taste. " The arrangement of pictures comprehends some of the difficulties which the artist experiences in the production of *one;* for a certain balance and repose are as essential for the eye, as a harmonious impression for the mind. Enlightened connoisseurs see excellence both in the Dutch and Italian schools, but they are often embarrassed in arranging them together. I am convinced, however, from instances I have seen, that this is to be accomplished satisfactorily. It is sometimes argued, that no one reads Milton and Crabbe alternately; but this is hardly a parallel case. Many go to a gallery to look at a particular picture, and see nothing else; the eye is blind when the attention is not actively exerted. So, in a room, the spectator selects his favourites, his favourites at least for the time, and scarcely looks beyond them. At another moment he will perhaps direct his undivided attention to works which he passed over on a former occasion. A certain congruity is sometimes to be accomplished, by attending to impressions rather than names and schools. Many an Italian picture would not be out of place with the Flemish and Dutch schools; while Vandyck, Rembrandt, Cuyp, and others, might sometimes harmonise in many respects with the genius of the South." (p. 61.)

" With regard to subjects, the mind, as well as the eye, must be respected: the *ethos* [spirit] of painting is quite compatible with familiar and homely subjects; and, on the other hand, the greatest Italian masters have sometimes sought for poetic impressions in regions where it would be unsafe to follow them. The subject often acquires elevation, and commands respect, by the evidence of mental labour and power in the artist. To a true connoisseur, this skilful application of principles derived from universal nature supersedes the mere subject; and the idea which he recognises, whatever may be its vehicle, is grand and poetical. Less experienced observers are often deceived by the title of pictures: 'A Court-yard' (de Hooghe) sounds unpromising enough; but when it is seen that the painter has represented *daylight* with magical truth, and that all is subservient to this, his aim must be acknowledged to be dignified. It is to be observed, too, that the influence of this high aim on the part of the artist often extends itself to the treatment of the materials which constitute his ostensible subject. It is easy to see from the unaffected feeling, as well as from the *relative* character of the execution in some (though not all) of the Dutch masters, that the real subject of their meditation was noble." (p. 62.)

" With respect to the colour of the walls on which pictures are hung, my opinion is singular without being novel. I am quite aware that it is necessary to consider wall, pictures, gold frames, and all, in relation to general effect: the gold, especially, is to be treated as part of the *coup-d'œil.* But, though I remember examples of light walls hung with pictures producing an agreeable effect, I prefer a colour which displays the pictures more, and must also maintain that living pictures are seldom seen to the best advantage against a bright ground; the quantity of actual light (it may always be assumed) making reflected light unnecessary: my idea, in one word, is, that the wall should not be so light as the lights of the pictures; and this supposes a sufficiently low tint. Of such colours, the most agreeable is the long established rich red, *The Glazenwood Catalogue for* 1843 *of American and other Hardy Shrubs, Herbaceous and Greenhouse Plants, Fruit, Forest, and Ornamental Trees, cultivated for Sale* by James Curtis. 8vo, pp. 26. London, 1843.

This is a priced catalogue, in which the plants are classed as American, Hardy evergreen Shrubs, Hardy deciduous flowering Shrubs and Trees, Perennial herbaceous Plants, Hardy ornamental Climbers, Greenhouse and Conservatory Plants, Greenhouse and Conservatory Climbers and Twiners, Fruit Trees, Orchard and Garden Trees and Plants, Ornamental Forest Trees, and Forest Trees for profitable Planting. In a preliminary page are the following paragraphs, which may be useful to the intending planter: —

"In selecting the future occupants of the shrubbery, great difficulty is often felt by young and inexperienced planters, from deficient knowledge as to their ultimate height. In this catalogue, Mr. Curtis has distinguished the relative height of each individual by the initial letters of the words *dwarf*, *medium*, and *tall* preceding the name; and he hopes he has, by this means, rendered it easy for the unpractised improver to choose the most fitting ornaments of the fore, middle, and back ground of the scene he is about to create or adorn.

"Mr. Curtis, having had considerable experience as a Landscape-Gardener, undertakes to survey and plan estates, of large or small extent, in any part of the kingdom, for the purpose of *ornamental* or *profitable* planting. He has paid particular attention to this department of his art, and is confident there is no situation, however ungenial in climate, sterile in soil, or uninteresting in appearance, that may not be rendered ornamental in *scenic effect*, and *profitable* in its future results."

Catalogue of Plants cultivated for Sale by Robert Buist, Nurseryman and Florist, Philadelphia. March, 1843.

This is a catalogue of greenhouse and hothouse plants, hardy trees and shrubs, hardy herbaceous plants, and roses. The number of kinds in each is surprising, and exceeds that to be found in most of our British nurseries. For example, *A*càcia, 27; Alstrœmèr*ia*, 11; Amarýll*is*, 52; Azàlea índica, 32; *C*áctus, 80; Camélli*a*, 166, &c. The hardy trees and shrubs are not so numerous as might have been expected, being chiefly confined to sorts which are ornamental; and the same may be said of the hardy herbaceous plants. A new Catalogue of Fruits is promised in July. In an address to the public Mr. Buist says, "my resources for acquiring the fruitful and floral beauties of the earth are every day increasing, which, with practical ability, shall keep this establishment, as it is now conceded to be, the first and best in the United States." The greenhouse department in his nursery has 16,000 square feet of glass.

Rural Chemistry: an Elementary Introduction to the Study of the Science in its Relation to Agriculture. By Edward Solly, Jun., F.R.S., F.L.S., Hon. Mem. Roy. Agr. Soc., Experimental Chemist to the Horticultural Society of London, Lecturer on Chemistry at the Royal Institution of Great Britain, &c. Small 8vo, pp. 169. London, 1843.

This little volume "formed the substance of a short series of articles on chemistry, which originally appeared in the columns of the *Gardener's Chronicle*. The interest which they excited in the readers of that journal has led to their republication in a separate and more complete form. It would have been easy to have greatly increased the size of the book; and indeed it was frequently very difficult to select, from the mass of information which exists, those facts which appeared most worthy of notice. The original object of the author was to give such an elementary sketch of the science, as should enable those ignorant of the subject more readily to comprehend the works of the various authors who have written on agricultural chemistry. As a general rule, care has been taken, as much as possible, merely to give well established facts, or, when doubtful theories are mentioned, to state distinctly that they are more or less problematical." (Pref.)

The great art of disseminating a knowledge of chemistry among practical men is to produce specific applications of it like that now before us, which unquestionably constitutes the best chemical book for gardeners, and which every young gardener ought to possess. We have several books of chemistry for farmers, and we trust we shall soon see one for architects and engineers, which, like agricultural chemistry, ought to combine geology. The only change which we should wish to see in Mr. Solly's book would be to have it entitled what it really is, "Horticultural Chemistry; an Elementary Introduction to the Study of the Science in its Relation to Horticulture."

The Quarterly Journal of Meteorology and Physical Science, published under the immediate Sanction and Direction of the Meteorological Society of Great Britain. No. VI. Edited by J. W. G. Gutch, M.R.C.S. London, 1843.

To those who take an interest in meteorological pursuits, this journal will afford a rich treat; containing as it does a great variety of communications, extracts from different publications bearing on the subject, reviews, &c.

Martin's Thames and Metropolis Improvement Plan: the Object being to supply the Metropolis with pure Water; to embank the River Thames and preserve the Sewage; to improve the Navigation below London Bridge; and to connect the Port of London with the Inland Railways. Pamph. 8vo, pp. 52. London, 1842.

There are a great many original and ingenious ideas in this work, and Mr. Martin deserves great praise for his perseverance in keeping the subjects treated of before the public. One of the objects is, "the improvement of the drainage of the metropolis, and preservation of the sewage for agricultural purposes." The subject is one which we have been attending to since 1829, as will appear by our Volume for that year, p. 690., and the *Builder* for March 1843, p. 45., from which we extract the following paragraph: —

"Might not the whole of the aqueous parts of the common sewers be returned to the country as manure, in mains of pipes, in the same manner as the water is brought in, and the solid part sent out in cakes like oil cake? This might be done by intercepting the matter contained in the sewers at different points, separating the solid from the fluid parts by filtration and compression, and forcing off the latter along cast-iron main pipes, by steam, or by previously forcing it to the summit of a tower. From the mains of liquid manure, conducted along all the principal roads, farmers and market-gardeners might be supplied with the liquid, exactly as houses are at present with pure water. Viewing this mode of getting rid of the water of the sewers as the converse of the mode of introducing clear water, all the requisite details for carrying it into execution will readily occur to any practical person. It might be tried at first on a limited scale, say along the Hammersmith Road, as far as Hounslow or Slough."

Having mentioned the *Builder*, we take this opportunity of repeating (see p. 81.) our strong recommendation of it to such of our readers as have relatives or friends connected with the building arts. It interferes with no other publication, and it is calculated to have an excellent moral, as well as professional, influence over a body of young men who probably amount, in England alone, to fifty or sixty thousand. Young gardeners cannot do better than associate with young carpenters, when these are like themselves of good moral character, and readers of scientific and moral works like that just recommended. The knowledge of geometry and architecture, which a carpenter requires to enable him to rise in his profession, entitles him to the same rank in an intellectual point of view with the gardener, though the science of vegetable culture and carpentry are as different as mathematics and chemistry.

The Emigrant's Hand-Book of Facts, concerning Canada, New Zealand, Australia, Cape of Good Hope, &c.; with the relative Advantages each of the Colonies offers for Emigration, and practical Advice to intending Emigrants. By Samuel Butler, Esq., Author of the "Hand-book for Australian Emigrants." 12mo, pp. 240, and two maps. Glasgow and London, 1843.

The subject is discussed in three chapters: British America, Australasia, and Africa and South America. The purpose of the work is, not to advise or persuade to emigration, nor to recommend one colony in preference to another, but simply to state the history and conditions of the different colonies, leaving to the reader to choose for himself.

"We have," says the author, "no partiality for one more than another—no desire to give an undue preference; or to depreciate one colony at the expense of another. This has been too much practised; and several valuable colonies have been seriously injured by unjust statements made, and unfounded prejudices created, regarding them, for the benefit of others possessing in no way superior advantages. Our object has rather been, by *detailing facts, to give the intending emigrant ample means to guide him in making a proper selection for the scene of his future exertions.* Emigration, the removal from the scenes around which all our affections have hitherto been concentrated, is a matter of grave importance, and one which ought to be deliberately and seriously considered; and the choice of the colony which the emigrant is to make the scene of his future home is equally entitled to careful and deliberate consideration.

"The labouring man, in so far as emigration depends on his own exertions, is, in the mean time, in a great measure restricted in his choice among the British colonies to Canada or the other provinces belonging to Great Britain in North America. The expense even of a steerage passage to Australasia puts it far beyond his power to seek any of these colonies, however strong his desire may be to do so. Indeed, Canada has been emphatically called the 'Poor Man's Home;' and, in the extended regions there belonging to Great Britain, the sober and industrious labourer or mechanic is certain of having his labour duly rewarded. We do not certainly hear of such ample fortunes being made in Canada as have been realised in Australia; but we have sufficient evidence to show that, after a very short residence in any of the British North American provinces, the exertions of the labouring man, if steadily and soberly pursued, will lead to comfort and independence."

The work may be safely recommended as the best guide to emigrants recently issued from the press.

ART. III. *Literary Notices.*

DECANDOLLE's Prodromus, vol. viii., we are happy to observe, is announced by Mr. Pamplin for publication in August or September next. Mr. Pamplin also has on sale a few beautiful engraved portraits of the illustrious author of that work. We had the honour of being introduced to Professor DeCandolle in Paris in 1828, and can vouch for the fidelity of the likeness.

In Jameson's *Journal* for April 1843, there is a sketch of the Writings and Philosophical Character of the late Professor DeCandolle of Geneva, by Dr. Daubeny, Professor of Chemistry and Botany at Oxford, which is extremely interesting and instructive.

A Treatise on the Management and Cultivation of Forest and Fruit Trees is in preparation by John Smith, Gardener and Forester to the Marquess of Bute.

THE

GARDENER'S MAGAZINE,

JUNE, 1843.

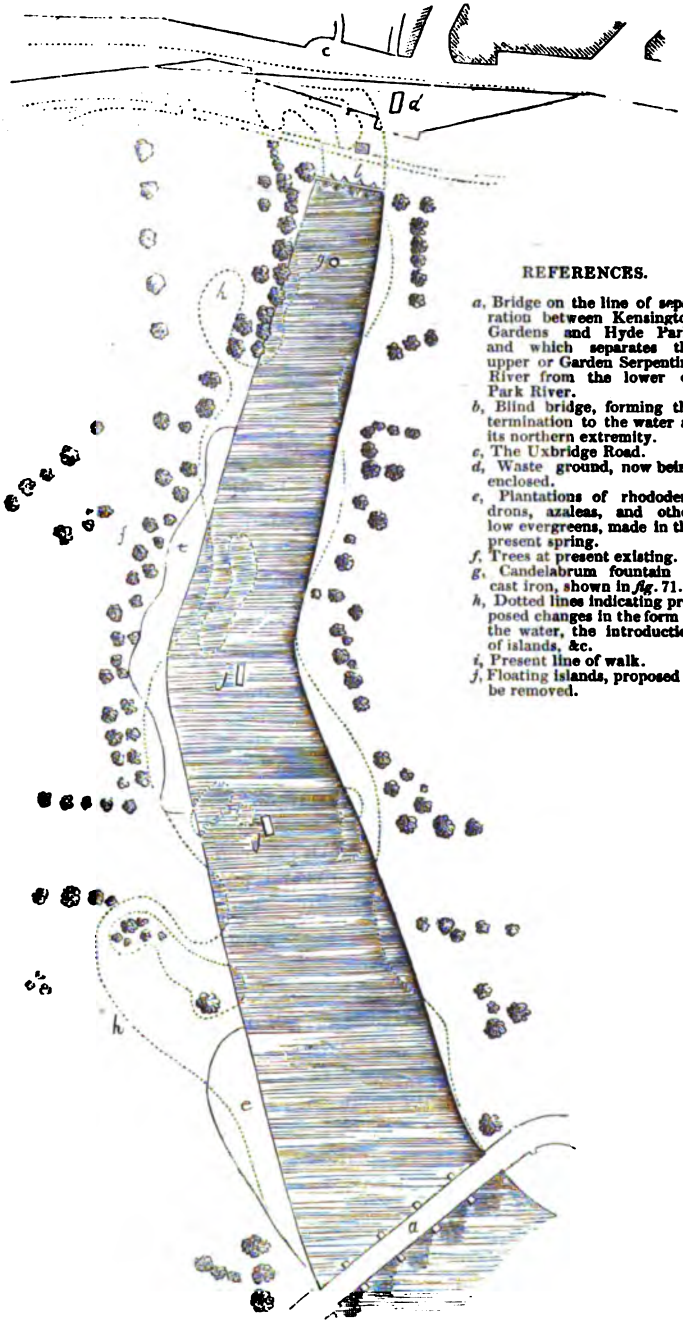
ORIGINAL COMMUNICATIONS.

Art. I. *Hints for the Improvement of Kensington Gardens and Hyde Park.* By the Conductor.

The improvement of Kensington Gardens and Hyde Park has been the subject of a variety of articles in this Magazine, from its commencement in 1826 to the present time, and we have at length been amply rewarded by seeing many of our suggestions carried into execution. The removal of the line of dead wall reaching from Cumberland Gate to the Gravel Pits, and the substitution of an improved line and of open railing, widening the public road in some places and enclosing a part of the waste in others, are what we have been trying for since 1816; and, though the ground formerly occupied as a kitchen-garden has not yet been added to the pleasure-ground, we are happy to find that the high dead wall, which has so long been an eyesore and an injury, will be removed, and set farther back from the public road, and that, instead of brickwork 18 ft. high, there will be a low parapet, crowned with an iron railing.

Our attention has been called to the subject of Kensington Gardens at the present time, by observing that a very complete collection of low shrubs, and especially of *Ericàceæ*, has been planted in two masses near the piece of water called the Serpentine River; and that a new line of boundary wall has been formed at the upper part of this piece of water, which, by adding a portion of ground to the gardens in that quarter, will render it practicable to give the water a better termination.

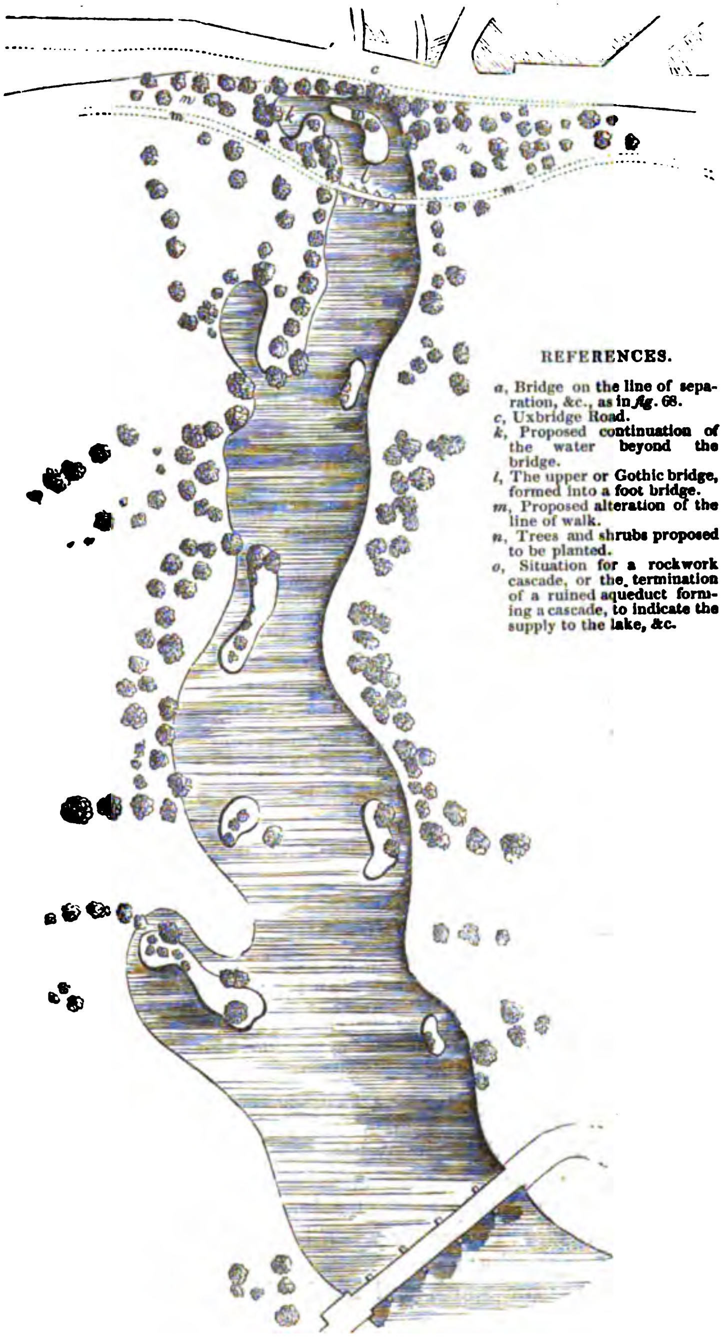
Fig. 68. shows a plan of that part of the Serpentine River which is in Kensington Gardens; the bridge *a* separating it from the part which is in Hyde Park, and which may be called the Lower Serpentine; and, at the opposite end of the figure, *c* representing the Uxbridge Road. The newly made plantations of shrubs are indicated at *e e*; not by the dotted lines *h h*, which show proposed alterations on the boundary of the water, but by the black lines, as explained in the references in the margin of the engraving. The widest part of these plantations is nearly



REFERENCES.

a, Bridge on the line of separation between Kensington Gardens and Hyde Park, and which separates the upper or Garden Serpentine River from the lower or Park River.
b, Blind bridge, forming the termination to the water at its northern extremity.
c, The Uxbridge Road.
d, Waste ground, now being enclosed.
e, Plantations of rhododendrons, azaleas, and other low evergreens, made in the present spring.
f, Trees at present existing.
g, Candelabrum fountain of cast iron, shown in *fig.* 71.
h, Dotted lines indicating proposed changes in the form of the water, the introduction of islands, &c.
i, Present line of walk.
j, Floating islands, proposed to be removed.

Fig. 68. *The upper Serpentine River in Kensington Gardens as it is, with dotted Lines indicating proposed Alterations to change the Character from that of a River to that of a Lake.*



REFERENCES.

a, Bridge on the line of separation, &c., as in *fig.* 68.
c, Uxbridge Road.
k, Proposed continuation of the water beyond the bridge.
l, The upper or Gothic bridge, formed into a foot bridge.
m, Proposed alteration of the line of walk.
n, Trees and shrubs proposed to be planted.
o, Situation for a rockwork cascade, or the termination of a ruined aqueduct forming a cascade, to indicate the supply to the lake, &c.

Fig. 69. *The upper Serpentine River in Kensington Gardens, as it would appear if the Alterations suggested in* fig. 68. *were carried into Execution.*

150 ft., and the narrowest part above 50 ft. The plants are planted in alphabetical order, each with its name attached; and they are distributed irregularly at proper distances, the intervals being planted with common laurel. The situation is completely sheltered, and slightly shaded; and the soil cool, soft, and moist. The plants have been planted with the greatest care, and the entire surface of the plantation is thickly mulched with rotten leaves. In short, no American shrubs could be placed in more favourable circumstances, with respect to growth. The names, however, of nineteen twentieths of the plants are necessarily too far from the eye to be read, and consequently the public will not benefit so much as they ought to do from the plants being named; and the laurels are not only useless, but as injurious to the plants as so many noxious weeds. The named plants do not require more shade and shelter than the situation affords naturally; and the laurels can only serve to deprive them of nourishment, and to give a general sameness of character to the plantation. We hardly expected to see such an example of obsolete practice in these Gardens; though we recollect the Scotch firs planted in the new plantation in Hyde Park, and the Black Italian poplars which still continue among the Lebanon and Deodar cedars in the Green Park. Every one of these laurels, in our opinion, ought to be immediately removed; or, to save appearances, they might stand till autumn, and then be quietly taken away, as the Scotch firs were some years since.

With respect to the named shrubs, very great praise is due to the Earl of Lincoln for having introduced labels into the Gardens; but, in order that the public may profit from these shrubs being named, they would require to be distributed in such a manner as to bring each species and its name near the eye. We have suggested the idea of placing them in small square and circular beds round the central basin opposite the east front of Kensington Palace, as shown in *fig.* 70.; in which the beds next the water are proposed to be planted with low shrubs, not allowed to rise above 4 ft. high; and the outer row with herbaceous plants, each bed being limited to one order or tribe. All the shrubs in the plantations *e e*, in *fig.* 68., would not be included in these beds, because a number of them would grow too high; but almost all the *Ericàceæ* (including the numerous kinds of rhododendrons, azaleas, kalmias, vacciniums, and heaths), with the daphnes, mahonias, &c., which have been planted, would be perfectly suitable, and would produce a splendid effect, not only by themselves, but by their reflection in the water, more especially when in flower.

The larger-growing shrubs we would dispose of partly in the plantations on the south and north side of the gardens, and partly in single specimens, enclosed in wire fences, along certain open portions of the walks.

Between the row of beds of shrubs and that of herbaceous plants, shown in *fig.* 69., we would form a gravel walk 15 ft. in width, connected with the grand south and north walk *d* in *fig.* 70., by the straight walk *c*. The warm colour of the gravel of this walk would relieve the view of the water from that cold, dull, monotonous appearance which is so often complained of in that part of Kensington Gardens, and which is the result of the want of warm colours in the scene. The only relief from the eternal green and blue is a momentary one on fine Sundays, when the banks are promenaded by gaily dressed females and children. This dull scene forms the view from the principal front of Kensington Palace; and, judging from Miss Burney's picture of court life in the time of George III., it may not have been unappropriate to the ideas of royalty of the by-gone generation. Now, however, thanks to the aquatic fowls with which this piece of water has lately been stocked, the attraction to walk on its banks is increased, and the monotony of the

REFERENCES.

a, Outer line of beds for herbaceous plants.
b, Line of beds, next the water, for low flowering shrubs.
c, Walk, 15 ft. wide, connecting the walk round the basin with the broad gravel walk, *d*, which crosses Kensington Gardens from north to south.
e e, Floating islands.
f f, Pedestals for statues, vases, or fountains, on the supposition that the water is surrounded by a stone margin.
g g, Strained wire fence.
h, Central fountain, to be worked by a steam engine, concealed in the adjoining mass of wood.

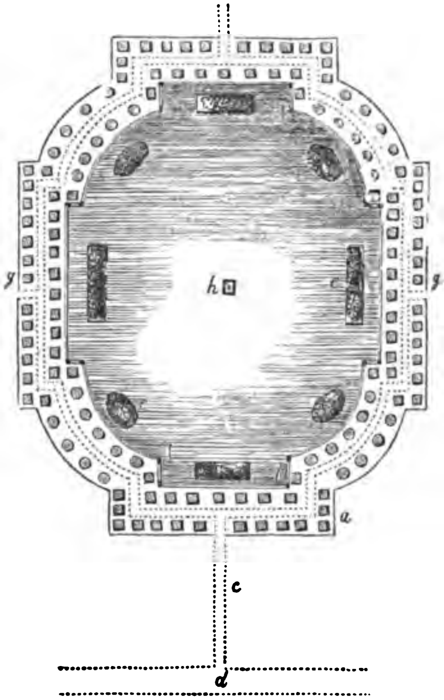


Fig. 70. *The Basin in Kensington Gardens as supposed to be surrounded with low Shrubs, &c.*

scene is, in a slight degree, diminished; but more islands are required, and, as the crowning improvement, a fountain should be placed in the centre with a single jet, which should throw the water up to the height of 50 or 80 feet, as we have suggested (Vol. for 1841, p. 331.). Independently altogether of colour, the circumstance of the surface of this water being some feet above the level of the walk *d*, from which it is chiefly seen by those who do not go nearer to it, adds greatly to its bad effect. Water should, if possible, always be placed in the lowest or apparently lowest ground in the view: but, when this cannot be done, the spectator who is to see the water ought to be on a surface rather above it than under it; at all events, he ought never, as in the case before us, to be placed on a lower level. This circumstance being taken into consideration, it would be a very desirable improvement to raise the surface of the walk *d*, and also all the ground between that walk and the water, to the same level as the surface on which the beds of shrubs and flowers are placed. On the side of the walk next the palace, the slope might either be gradual or comparatively abrupt; the distance from the palace windows being such as to render it a matter of indifference which mode is adopted.

The floating islands in the figure are shown much larger than they really are; and, instead of eight, only three are executed, and these are not placed to the greatest advantage. The beds containing both the shrubs and herbaceous plants we would surround with 4-inch brick edgings; as well to keep them distinct and regular, as to raise them a few inches above the general surface. They would always be kept abundantly moist by the high level of the water, which would be an immense advantage to the American shrubs. With respect to the herbaceous plants, they might be supplied by the Royal Botanic Garden at Kew. Both lines of beds, and also the broad gravel walk, might be protected from sheep by a strained wire fence, as indicated in the figure; or each bed might be enclosed separately, and this we have ascertained may be done by means of Mr. Taylor's wire netting (p. 83.), attached to a frame, at a very moderate expense, which will be hereafter exactly stated, as will the estimate for the fountain in the centre, which is kindly preparing for us by Messrs. Easton and Amos.

A very great improvement to Kensington Gardens is now being made by enclosing a piece of waste ground, hitherto the receptacle of the worst kinds of filth, at the upper end of the so-called Serpentine River. This piece of waste ground is represented in *fig.* 68. at *d*, and the use that we propose to make of it is shown in *fig.* 69. at *o*, *k*, *l*. By means of this addition the termination of the water might be very effectually and picturesquely concealed; and, instead of the hideous cast-iron fountain shown in *fig.* 71., a cascade from some masses of rockwork, or from the abrupt termination of a ruined aqueduct, might deliver, as a waterfall, the same quantity of water which now flows from the fountain. We do not pretend to say that artificial rockwork, or the remains of an aqueduct, will not be works of art as much as the cast-iron fountain; all that we contend for is, that they will be works of art more in accordance with the surrounding scenery, and such as will not shock the feelings of persons possessing taste in landscape.

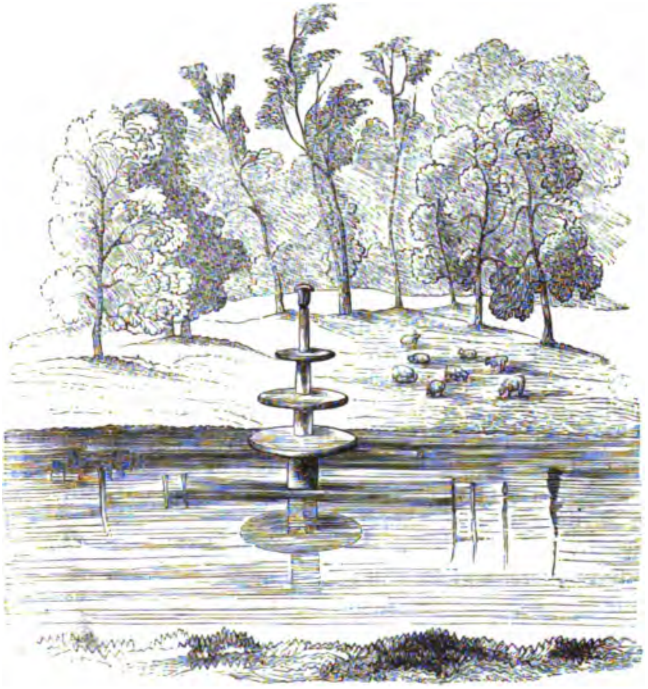


Fig. 71. *Cast-iron Fountain in the Serpentine River in Kensington Gardens.*

On referring to *fig.* 69. it will be observed that we propose to widen the river in several places, and to introduce islands, so as to give it the only character adapted for still water, viz. that of a lake. On some of the spots on which islands would be formed there are already large trees, and on others we would plant low growths, such as rhododendrons, azaleas, &c., leaving glades of turf; and some of the islands should be almost entirely without trees and shrubs, so as to harmonise their surface with that of the Gardens generally. The margins both of the islands and the boundary shores we would vary by coarse gravel, blocks of stone, &c., so as to be more in accordance with nature, and to produce a better harmony of colouring. At present the grass grows to the very edge of the water, which is always unnatural, and produces a cold and monotonous effect. In this respect, the shores of the water in St. James's Park are much better managed.

The management of the banks of pieces of made water is very seldom artistical. The object, in such a case as that before us, is, or ought to be, the imitation of the banks of a natural lake, and supposing it to be in a similar situation to that in which the artificial lake is placed; the imitation, in this and in all similar cases, being such as never to be mistaken for wild nature. (See our Vol. for 1837, p. 597.) It is of great importance to keep this last principle constantly in view; because it is the carrying of it out which constitutes a piece of natural-looking water in a pleasure-ground a work of art. In such a situation as that in Kensington Gardens, a natural lake may be supposed to have the banks clothed with aquatic plants, such as reeds, rushes, &c., so as to give them a marshy character; to have them broken by the treading of horses or cattle approaching to drink; or comparatively firm and smooth, with grass growing down nearly to the water's edge, but still separated from it by a line of shore occasioned by the varying height of the water. Here then are three distinct characters which may be imitated by art, and that in such a manner as that the imitation shall not be a fac-simile of nature, but a resemblance of it. In the first case, cultivated aquatic plants are to be employed instead of water weeds; in the second, firm and dry warm-coloured broken ground is to be substituted for a poached surface; and, in the third case, the separating line between the water and grass is to be coated with coarse gravel or small stones, with perhaps occasional blocks connected with shrubs, so as to give a character of firmness, and introduce a warm colour between two cold colours.

(To be completed in our next.)

Art. II. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the Conductor.

(Continued from p. 222.)

IV. Certain Innovations suggested relative to the Selection of Ground for Cemeteries, Mode of performing Funerals, etc.

Would not a law, enacting as follows, answer every purpose of Mr. Mackinnon's bill? That no graves should be made except on ground that never was opened before; that, when only one coffin was placed in a grave, it should not be less than 6 ft. below the surface; that, when more than one coffin was to be contained in the same grave, each coffin should be separated from the other by a layer of earth not less than 6 ft. in thickness; that all burying in vaults and catacombs be discontinued; and that no new burial-grounds be formed in London within two miles of St. Paul's, nor in country towns within half a mile of their suburbs. Such a law would at once prevent interments from being made in most of the London burial-grounds, while it would admit of all the unoccupied ground, whether in London or out of it, being used; and thus no injustice would be committed towards those who have recently enlarged their burying-ground; it would, at the same time, check the disgusting and dangerous practice of burying ten or twelve bodies close upon one another in one grave, now practised both in the old churchyards and in the new cemeteries.

A law to attain these objects, combined with regulations to prevent graves from being reopened within sixty years if in the country, or not at all if in a town, would, if strictly enforced, probably be found sufficient for every purpose, as far as health is concerned. Under the influence of such a law there seems to be no objection to every sect having its separate cemetery or cemeteries; to individuals forming cemeteries as commercial speculations; or to different trades or professions having their separate cemeteries. The greater the number of present cemeteries, the greater the number of future public gardens.

The law should be modified with reference to Jews and Quakers, since it is a part of the religion of the former that no grave is ever opened a second time; and the latter adopt the same practice, though not, perhaps, from religious principle, but from a general regard to decency and propriety. It would be sufficient to enact that the burying-grounds of these religious bodies, in common with others, when once filled, should be shut up for ever, if in towns, and that the new cemeteries opened by them should always be in the country.

All burial-grounds whatever within the precincts of towns, when once filled, that is, when the whole ground has been buried in, even if with only one body in a grave, should be shut up as burying-grounds, and a few years afterwards opened as public walks or gardens; the grave-stones and all architectural or sculptural ornaments being kept in repair at the expense of the town or village; such trees, shrubs, or plants being planted among the graves as the town council, or, if a village, the parish vestry, may determine.

The distance from a town at which a cemetery ought to be placed will depend a good deal on the elevation of the site, the nature of the soil, and the sources from which the town obtains its water. If there are pervious strata lying on impervious strata, immediately under the surface of the ground intended as a cemetery, and these strata traverse ground without the cemetery in which wells are likely to be dug, and have a descent towards it, the moisture of decomposition will be carried by the rains along the strata to the wells, and to all artificial depositories, or natural outlets for the water. An elevated situation, with a soil of gravel, sand, or chalk, to a great depth, is evidently preferable to all others, because the moisture generated will be carried perpendicularly down by the rains, and the gases evolved will be carried off by the winds. No human dwellings ought to be made within a cemetery, unless we except the entrance lodge, which might, if desirable, always be made outside the gates, or so as not to have all its windows looking directly on the graves. It would frequently be advantageous to have a space outside the cemetery fence, of 50 or 60 feet in width, to be planted with trees, varying in height according to the nature of the situation and soil; the object being to disguise the view of the graves from the nearest houses, without producing too much shelter to impede the action of the sun and winds on the surface of the cemetery.

Such a law as we contemplate should prohibit interment in churches or public buildings; whether in vaults, catacombs, or in the floor of the church or vault, without any exception whatever; it should prohibit the formation of private vaults, or private or family graves or graveyards, in towns, or any where except in the country, and there they should be placed in spots at least 100 ft. from any other building. The law should also, as we think, enforce the clearing out of all public vaults under churches or chapels, whether in town or country, and not even excepting those of the newly formed public cemeteries. That the vaults and catacombs of these cemeteries are liable, to a considerable extent, to the same objections as those in the old burying-grounds and under churches, is a fact which can be proved by reference to what has taken place both in the vaults of the Kensal Green Cemetery and in those of the London and Westminster Cemetery *; and, in short, any person walking through them will require no other evidence than that of his own senses.

We may, perhaps, be thought unreasonable in wishing to prevent interments in Westminster Abbey and St. Paul's, or in the royal vault at Windsor, but we consider that the memory of the great men of the nation, including even our sovereigns, would be quite as much honoured by having their bodies buried in the free soil in the country, and appropriate monumental cenotaphs erected to their memory in these and other national buildings, as by having their bodies buried under their monuments, or preserved in wooden or leaden cases in vaults or catacombs. Surely it is pleasanter in idea, when looking on the statue of Dr. Johnson in St. Paul's, to think of his remains being covered by the green turf in the open ground of a cemetery or a churchyard, than to think of them lying in black earth, saturated with putrescent moisture, under the damp paved floor of the crypt of a cathedral. There is no doubt that burying in sepulchres, by which the body is preserved from mixing with the soil, is of great antiquity, and it was doubtless justified by the opinions of mankind in the early ages of history; but it may be fairly asserted that the practice is not in conformity with the opinions and spirit of the present age. Security from desecration was, no doubt, a main object for this mode of burial, and certainly it was a protection from the hyena, the fox, the dog, and other wild carnivorous animals that were common in the early stages of civilisation; but neither then nor now is it any permanent security against desecration by the human species. On the contrary, it is a mode certain of ending in desecration, sooner or later. Witness the mummies of Egypt, unprotected even by the Pyramids; or look to what has been taking place for many years past in the vaults of churches in London, as given in evidence in the Parliamentary *Report*, which we have so often quoted; or turn to the volumes of travellers on the Continent since the peace of 1814.† The truth is, that in this matter, as in most others, we follow the practice of those who have gone before us, without enquiring into its reasonableness or suitableness to our present views of nature. A gentleman in the country builds a chapel in his grounds, and his architect tells him that it would not be complete without a family vault, and he therefore has one built, otherwise he would not be like his neighbours. As to public vaults in churches, their origin is security, and they are continued partly owing to the crowded state of the churchyards, but principally on account of the higher fees obtained from those who bury in them by the clergyman and the undertaker. Hence, on account of the expense, burying in vaults becomes a mark of wealth or distinction, and for that reason is adopted by many of the London tradesmen, even in the new cemeteries. How much better for the health and improvement of the living, and the honour of the dead, were the money now laid out in vaults and in burial fees expended on handsome monuments, or even on increased space round graves in the open ground, so as to admit of interring only one coffin in a grave! How much more natural and agreeable to see the grass graves of a family placed side by side in a small green enclosure, the property of the family, which cannot be disturbed; than to see the cover of a brick grave or a vault, in which we know their bodies have been let down one over the other, and there remain unmixed with soil, a pestilential mass of putridity; or see the coffins which contain them deposited on stone shelves above ground, forming separate portions of preserved corruption!*

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* Mr. Jones, undertaker, residing in Devereux Court, Essex Street, Strand, placed a body in a leaden coffin and the other usual cases, and deposited it in the catacombs of Kensal Green Cemetery. It had remained there about three months, when he was informed by the secretary of the cemetery company that "the coffin leaked, and that he must see to it immediately." Mr. Jones, accompanied by his assistants, went to the cemetery, removed the body from the horizontal stone resting-place, which was sealed very carefully at the ends and round the sides. It was necessary to remove the lid of the outer coffin and turn out the body, enclosed, as is usual, in the shell and leaden coffin; these were reversed, when it was found that a small hole existed at the under part of the leaden coffin. This hole was enlarged with a gimlet by one of the assistants, Mr. Thomas Moxley; the gas which escaped extinguished a lighted candle three distinct times, and he was rendered incapable of following his occupation for several weeks. (*Appendix to Report on the Health of Towns*, p. 208.)

† In the autumn of 1813 we passed two days in and about the small town of Kowna, on the Niemen, celebrated for its lime trees and its honey; and looking into the vaults of the church, we observed the floor covered with

The directors of the Kensal Green Cemetery have offered seven acres of their ground for the interment of the paupers of seven London parishes, which exceed in number 1,000 annually. "It has been found," they say, "that seven acres will contain about 133,500 graves; each grave will receive ten coffins; thus accommodation may be provided for 1,335,000 deceased paupers, and the seven acres, at an average of 1,000 burials a year, will not be filled for 1,335 years." (*Annual Report of the General Cemetery Company*, dated 9th June, 1842, p. 8.) The idea of accumulating such a mass of corruption in such a limited space is horrible, and we trust will never be listened to for a moment by the public. The directors introduce theirproposition by the following passage: "The directors of the General

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bodies in their shrouds, which had been turned pellmell out of their coffins. On some the flesh and hair were still remaining. We were informed this was done by the French on their retreat from Moscow the winter before, in search for the loaf of bread and bottle of wine, which it was at that time customary for the Poles and Lithuanians to place in the coffin along with the body, previously to its interment.

* The late Sir Francis Chantrey had caused a splendid vault to be built for himself, and, with much kindness, proposed to Allan Cunningham that he also should be buried in it. "No, no," answered Allan; "I 'll not be built over when I'm dead; I 'll lie where the wind shall blow over, and the daisy grow, upon my grave." (*The Builder*, No. 3. p. 40.) In the *Gentleman's Magazine* for December, 1842, a biographical notice of Allan Cunningham, Esq., is given, in which it is stated that he died on Oct. 29., aged 56, and that on the 4th of Nov. his remains were removed to the General Cemetery in the Harrow Road, for interment in the catacombs of that place. Having written to Mr. Peter Cunningham, the son of the deceased, with a copy of the above extract from the *Builder*, to ascertain the facts of the case, his answer is: "My father is buried in the General Cemetery at Kensal Green; not in a close, damp, pestiferous vault, or in a brick grave (just as bad), but in his native earth, that he may mingle with what he sprung from. The extract you send me is perfectly correct. My father had always an abhorrence of Westminster Abbey vaults and brick-built graves.—*P. C. March* 2. 1843."

Cemetery Company, knowing the difficulty as well as the expense of obtaining ground for burial, (as a cemetery always depreciates the property around,) and contemplating that a Bill may pass to prohibit burials in the crowded metropolis, offer seven acres of their ground at Kensal Green, adjoining the Cemetery, for the burial of the poor, under such regulations as may be thought advisable." (*Report*, &c., p. 8.) Fortunately for the public, the calculation of the directors is altogether erroneous. An acre contains 43,560 square feet, and supposing the pauper graves to be 6 ft. 6 in. by 2 ft. 6 in., this is equal to 16¼ square ft., and hence, dividing 43,560 ft. by that sum, we have 2,680 graves per acre, which multiplied by seven gives 18,760 graves in seven acres; something more than one seventh of the number which the directors say the seven acres will contain. But let us take even this limited number of 18,760 graves, and multiply it by 10, the number of pauper interments which the directors propose to make in a grave, and we have 187,600 bodies deposited in seven acres. Something less indeed than the 1,335,000 bodies which the directors propose to get into that space, but still enough to put the public on their guard against men who can hazard such statements; for it must be remembered that this error in the calculation has nothing to do with the intentions of the directors. One million three hundred and thirty-five thousand bodies deposited in seven acres may well depreciate the property around. If it be true, as Mr. Walker, the author of *Gatherings from Graveyards*, observes (*Report on the Health of Towns*, p. 412.), that "layers of earth, of several feet in depth, can no more intercept the transmission of gas into the atmosphere, than they can by their density prevent the infiltration of water," then indeed these seven acres, if occupied even with the smaller number of 187,600 bodies, might be considered as the crater of a volcano, vomiting forth poison in the form of a column of gaseous matter, which, changing in direction with every change of the wind, would poison the atmosphere for many miles round; while the water of decomposition would poison the springs of the subsoil.

It is lamentable to witness in the proprietors of cemeteries, and in some members of the Committee for enquiring into the Effect of Interments in Towns, the manner in which the subject of the interment of paupers, and of the poor generally, is discussed. We do not limit the remark to the proprietors of cemeteries, the committee referred to, or to the rich or influential classes in this country, but extend it also to every other class which considers itself above the poor; for example, to parish vestries. One would think that the poor were considered as animals of a different species, or as totally without the feelings which belong to the rest of mankind. While the bodies of the dead rich in every capital in Europe are to be placed singly in catacombs or graves, those of the poor are to be trenched in in layers as in France, thrown into a common pit as in Naples and Leghorn, or buried ten or fifteen in a grave as in London.* Some of the committee who examined witnesses seem particularly anxious to abridge the process of taking care of the poor, by placing quicklime in their coffins. The questions put by some of these persons evinced, in our opinion, great want of humane feeling generally, and an utter disregard of the feelings of the poor.

"Should you have any objection, if there was a law made that there should be so much lime put in with the body, so as to destroy it in a certain time?"

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* The price of land, within ten miles of London, is much too high to admit of burying paupers singly in the London cemeteries; but one thousand, or even two thousand, acres of poor waste land, admirably adapted for burying-ground, might be purchased in the parishes of Woking, Chobham, Horsall, Perbright, Pyrford, &c., at from 4*l.* to 8*l.* per acre. The land alluded to is too poor to admit of cultivation for arable purposes; but it would grow yews, junipers, pines, firs, and other cemetery plants, with which it might be planted in rows, in such a manner that the graves could be made between the rows.

"Do you think there would be any objection to burying bodies with a certain quantity of quicklime, sufficient to destroy the coffin and the whole thing in a given time?"

are questions continually recurring. One honourable member put the quicklime question so often, that we took the trouble of counting the number of times, which we found to be twenty. It would no doubt be very desirable in the eyes of those who find themselves above the poor, to get rid of "the whole thing" at the expense of a little quicklime; but, unfortunately for this desire, and fortunately for the poor, and sometimes for the cause of justice, there are the bones, which, as we have before seen (p. 3.), are not to be got rid of so easily. Very different indeed were the feelings expressed by the Bishop of London, and some other clergymen who were examined. It is very natural for the rich to hate the poor, and wish to dispose of them, and of "the whole thing," with as little trouble as possible; but this is the feeling of wild nature, exactly the same which leads a herd of deer to forsake a wounded individual. Cultivated nature, whether that cultivation be the effect of religion or philosophy, ought to lead to a very different mode of feeling. Sympathy with the whole of human nature must surely be productive of more happiness to the individual who feels and exercises that sympathy, than when it is limited only to a part; to those in the same circumstances as ourselves, or who are connected with us by the ties of relationship or friendship. It is certain that many of the rich have very little sympathy for the poor, and equally certain that there are others among the rich who evince much sympathy for them. Which of these parties comprises the most useful members of society, and by which is the most happiness enjoyed?

It should never be forgotten, that what are called the poor and paupers are fellow-creatures, and that the difference between the former and the latter is very frequently matter of accident. Every poor man, however honest, industrious, and even talented, is liable to become a pauper. The common idea is, that a pauper is a person who has brought himself into destitution by improvidence or misconduct; but, admitting this to be sometimes the case, it cannot generally be so. Most paupers, in the ordinary state of the country, are aged persons, no longer able to work, from infirmity or disease. Many industrious persons are brought to the state of paupers by unforeseen accidents; by fire, water, storms, robberies, the death of persons on whom they chiefly depended, and by a variety of other causes over which they had little or no control. Admitting that a number of pauper children have become so by the recklessness of their parents, is not that the fault of the government in not having provided for the education of the poor, by which they would have acquired habits of self-control, and been taught the advantage of foregoing a present enjoyment for a future good? Admitting even that a number of persons have brought pauperism on themselves, is that a sufficient reason for interring them in a different manner from the other poor? We think not; and therefore we contemplate the provision of no particular part of a cemetery for paupers: but would bury them indiscriminately in those parts of the ground destined for graves without monuments; and also among those parts having monuments, in order that by surrounding the latter with plain spaces, they may, as already observed, have more effect.

The following suggestions are made with a view to the interment of the poor, of paupers, and of such persons as desire no monuments to their graves, belonging to London; and they may apply also to some other very populous towns, such as Manchester or Liverpool. — Suppose London divided into four or more districts; then let each district, besides its permanent cemetery, have a temporary one for the use of all persons whatever who did not wish to have monuments to their graves, and of course including paupers without friends sufficiently wealthy to bury them in a monumental cemetery. This temporary cemetery may be merely a field rented on a 21 years' lease, of such an extent as to be filled with graves in 14 years. At the end of seven years more it may revert to the landlord, and be cultivated, planted, or laid down in grass, in any manner that may be thought proper; the landlord binding himself and his successors by such a deed as should be inseparable from the transfer of the property, that the field should never again be let for the same purpose, or for building on. To render this the more certain, the transaction ought to be recorded in some public register, and also on monumental stones placed at the angles of the field, or one stone in its centre. Landed property held by public companies, as being least likely to change proprietors, is peculiarly suitable for this kind of occupation. There is, for example, along the Uxbridge Road, near Acton, an estate belonging to the Goldsmiths' Company, which would make an admirable cemetery of this description.

We see no objection to taking land for temporary cemeteries at a considerable distance from a town, provided it were on the line of a railway, as, for example, at Bagshot Heath; and we can see no difficulty in the different districts of such a city as London having a place of temporary deposit for their dead, whether paupers who paid nothing, or poor persons who paid moderately. There are depositories of this kind in Frankfort and Munich*; and they are found to add greatly to the convenience, economy, and salubrity of persons having only small dwelling-houses, and moderate incomes. Were depositories of this kind established in the metropolis, it might be so arranged that a number of bodies should be conveyed to the place of interment at the same time, and this might be done with appropriate decency and respect in a railway or a steam-boat hearse. There are thousands of acres of the poorest gravelly soil, which the Southampton railway passes through, that at present do not rent for more than 3*s*. or 4*s*. an acre, which would afford a cemetery sufficient for all the poor of London, and the rich also, for ages to come; and the same may be said of some thousands of acres not far from the Thames, in the neighbourhood of Chertsey. In proportion as the land was filled with graves, it might be planted with trees, or laid down in grass.

We can see no sufficient reason against having permanent monumental cemeteries, as well as temporary ones which are to have no monuments, laid out on poor soils at great distances from London, along the railroads, with cooperative railroad hearses, and other arrangements to lessen expense; which would admit of more ground being spared in the suburbs for public gardens and breathing-places. Nor does there appear to us any objection to union workhouses having a portion of their garden ground used as a cemetery, to be restored to cultivation after a sufficient time had elapsed. The bones in this and in every case where the ground was planted or cultivated would be at least 6 ft. below the surface, and, where it was thought necessary, they might be protected by covering-plates, as already described. Proprietors of land, we think, ought to be encouraged to bury on their own grounds in the free soil; a proper officer, who might be the local registrar, or one of the churchwardens, taking cognizance that the grave was of the proper depth, and that all the other conditions necessary for insuring decency and salubrity were fulfilled.

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* The cemetery of Frankfort on the Main is entered through an open propylæum between two wings. In one of these wings is the residence of the overseer and assistants; while the other contains ten cells, in which bodies in coffins are deposited for some days previously to interment. As a precaution against premature inhumation, cords are fixed to the fingers of the deceased, communicating with a bell, so that the least motion, in case of a person's revival, would be instantly made known to an attendant stationed in the apartment adjoining these cells. There is also a spacious waiting-hall on each side of the entrance, for the accommodation of those who accompany the funerals. It is strictly prohibited to inter any corpse till infallible signs of decomposition shall have become obvious; and, though this might occasion considerable inconvenience in a private house, no evil results from it here, because interment takes place immediately afterwards. There is also a receiving house (Leichenhaus) to the large cemetery at Munich. (*Arch. Mag.*, vol. ii. p. 136.)

The general cemetery at Munich is surrounded by a border of trees and shrubs, with the exception of one end, in which is placed a semicircular building, composed of an open colonnade in front, with vaults underneath. In the centre of this semicircular building is a projection behind, called the Leichenhaus, containing three large rooms, in two of which (one for males and the other for females) the dead, as shrouded and deposited in their coffins by their relations, are exposed to view for forty-eight hours before they are committed to the earth. The other room is for suicides and unowned bodies.

The expense of funerals has last year been considerably lessened about the metropolis by the introduction of one-horse hearses, which convey the coffin and six mourners to the place of interment. These appear to have been first suggested in 1837, by Mr. J. R. Croft, in an article in the *Mechanic's Magazine*, vol. xxvii. p. 146., and the idea has subsequently, in 1842, been improved on and carried into execution by Mr. Shillibeer, to whom the British public are indebted for the first introduction of the omnibus. Mr. Shillibeer's funeral carriage embraces in itself a hearse and a mourning coach, is very neat, and takes little from the pomp, and nothing from the decency of the ordinary funeral obsequies, while it greatly reduces the expense; the hire of a hearse with a single horse costing only 1*l.* 1*s.*, and with two horses, 1*l.* 11*s.* 6*d.* These carriages have one division for the coffin, and another for six mourners; and when the coffin has been taken out for interment, before the mourners reenter to return home, the front part of the carriage and the fore wheels are contracted and drawn close up to the hinder or coach part of the carriage by means of a screw, so that the part for containing the coffin disappears, and the whole, when returning from the place of interment, has the appearance of a mourning coach. The invention is ingenious and most useful.

Perhaps the expense to the poor might be still farther lessened by the use of light low four-wheeled vehicles for conveying the corpse, which might be moved by a man, or by two men. We see no reason why the attendants at the funeral of a poor man should not move this carriage by turns; as in various country places, more especially in Scotland, where the bodies even of respectable farmers are, or were forty years ago, carried to the churchyard on handspokes by the relations of the deceased. The same idea has occurred to Mr. H. W. Jukes, whose carriage for walking funerals is shown in *fig.* 72. In this figure, besides the cross handle in front for two persons to draw by, there are two handles behind for assisting to push it up steep hills, or by pressure or drawing back to retard it when going down hill. These last handles should be made with a hinge to let down when the coffin is being taken out; and in a level country they may be altogether omitted. The pall, or mortcloth, lies over the coffin. The dimensions of the body of the carriage should be about 7 ft. by 2 ft. 6 in. inside measure; the height from the bottom to the roof may be 4 ft.,

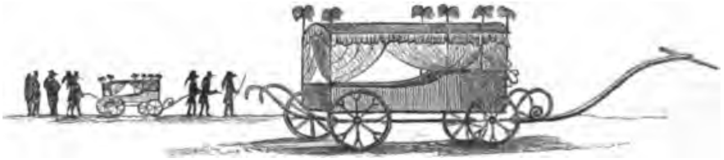

Fig. 72. *Mr. Jukes's Truck-Hearse.*

and from the roof to the ground 6 ft. In a funeral with this machine, no hired men are necessary; the man who precedes the procession should be one of the mourners, or the joiner who made the coffin, and the labour of drawing should be shared by the whole in turns. Persons who have not attended a walking funeral are not likely to be aware, not only of the fatigue to the bearers and attendants, but of the very disagreeable effects, more especially to the man at the head, whose head and shoulders are under the pall, of the smell, and sometimes the moisture, proceeding from the coffin. Could Mr. Jukes's truck-hearse, therefore, be generally introduced, not only in towns, but in country parishes, it would be a great blessing to the poor. The expense of funerals to the poor might be still farther diminished by the use of the hand-bier, a figure of which will hereafter be given, as practised formerly in Scotland, and as it still is in various parts of the Continent, more particularly in Poland. In the latter country the body is put in a coffin of coarse boards, in which it is carried to the church, placed on a bier, and a bottomless coffin of a superior description placed over it. The service being read, two of the mourners carry the bier to the side of the grave, when, two cords being introduced under the coffin, the whole is lowered to the bottom of the grave, while the case is drawn up by two back cords which are attached to its top.* These innovations will probably be resisted at first, because, among other things, they would render unnecessary some of the undertaker's men†; but, as mankind cease to become slaves of custom, various

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* We saw a funeral performed in this way in the neighbourhood of Warsaw, in June, 1813. The body was not buried in the churchyard, but in the margin of a wheat field, the son of the deceased not being able, as we were informed, to pay the churchyard fees. In Rome, and some other cities of Italy, the body is placed in a stone sarcophagus, while the funeral ceremonies are performed; after which it is deposited, sometimes only for a day or two, and in the cases of people of greater rank for some weeks, in a vault or catacomb: it is then taken out and buried in the free soil.

† People are not generally aware that the origin and type of the array of funerals commonly made by undertakers is strictly the heraldic array of a baronial funeral, or the funeral of persons entitled to coat armour, all of which were attended by heralds; the two men who stand at the doors being supposed to be the two porters of the castle, with their staves in black; the man who heads the procession, wearing a scarf, being a representative of a herald at arms; the man who carries a plume of feathers on his head being an esquire, who bears the tabard of arms, including the shield, sword, helmet, gauntlet, and casque, with its plume of feathers; the pall-bearers, with batons, being representatives of knights-companions at arms; the men walking with wands being supposed to represent gentlemen ushers, with their wands.

The cost of the men who bear staves covered with black, and who represent the two porters of the castle, varies from 18*s.* to 30*s.*; and the man who heads the procession, representing the herald at arms, costs from 2*l.* 11*s.* 6*d.* to 5*l.* 5*s.*, and so on. In general the poorest person does not fool away less than 3*l.* 3*s.* for attendants of this kind. (*E.C.S.*) In the case of truck-hearses and hand-biers, all these expenses might be spared, by the mourners acting in succession as the leader or herald; or dispensing with the leader altogether, as is generally the case in Scotland. At the funerals of persons of rank, heralds and hired mourners have in every age attended, and formed an array of pomp and simulated grief; but the practice seems inconsistent with real sorrow, and should therefore be rejected by people of common sense. "If, says a correspondent, "the poor were wise, their funerals would be as simple as possible: a plain coffin, borne by near male relations, and followed by the family and friends of the deceased in decent mourning, but without any of the undertaker's trappings on their persons, would be sufficient. The poor like funeral pomp because the rich like it; forgetting that during life the con-innovations of this kind will be adopted, which at present will be rejected as absurd; but which it is nevertheless desirable to suggest, with a view to induce men to examine into the possibility of departing from the beaten track. The thick crust of prejudice must be broken up before it can be dispersed; and the debacle must precede the clearing of the river.

(*To be continued.*)

ART. III. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 238.)

LETTER XIV. *Growing, Training, and General Management of Ericas.*

HAVING promised you when here a few remarks on my method of *growing, training, and general management* of that beautiful tribe of plants the *Ericas*, and having this morning an hour to spare, I take the opportunity of fulfilling my promise, in a plain humble sort of way; not professing to say that my system and general management are superior to those of any one else. One thing I have long thought, viz. that the general management of this beautiful tribe of plants is very imperfectly understood: that many noblemen, gentlemen, and amateurs have been deterred from purchasing plants, and building houses, &c., for the cultivation of them, because it has been said that they are so short-lived and uncertain. It has been asserted many times in my *hearing*, and that too by some of our best growers, that there is no certainty of the life of the most healthy heath. Why should that be? I have myself thought it is through mismanagement, and perhaps in time I shall not be the only one that fancies the same thing. As I have before stated, go to any common where our own natural heath grows, and examine the surface soil where the heath is most luxuriant: it will be found a loose decayed vegetable earth, gritty, sandy, or stony; firmer a distance down; and most generally on a subsoil of stones, flints, or sand, naturally well drained: where the rush thrives, the heath does not. Why should we sift soil for the cultivating of those plants, and pick out all the stones? Surely that must be acting in complete opposition to nature; and until such times as we think proper to try and assist nature, we need not expect to perceive much progress. If the soil were more generally used in a rough state, and plenty of stones thrust amongst it, I am perfectly satisfied we should hear of but few complaints about the unhealthiness and dying of heaths. I say, if they only get proper treatment, it will be no more likely to see a dead heath than it would be to see a dead donkey. There would be but few complaints about mildew or blights of any kind. The cause of mildew is nothing but drought and poverty; dry at bottom, foggy and damp at top, will soon stock a house full of plants with mildew. Sulphur dusted on them in a proper manner will certainly cleanse them of that pest for a time; but what is the preventive? not sifted earth with the stones picked out, I am perfectly satisfied. No, the stones are good.

I found a very good collection of ericas at Bicton gardens: the generality of them tall naked plants, many of them 5 ft., 6 ft., and even 7 ft. high, with five or six great hazel and ash stakes thrust into the pots to hold them up, and tied, in some instances, with matting as wide as my finger; many of them smothered with mildew, more particularly one large Massòn*ii*, which was completely scorched up with it, and to all appearance dead. By continual perseverance with sulphur, I got completely rid of that pest. The whole of them being potted to such an unreasonable height above the rim of the pot, and the pot filled entirely to the rim, it was impossible to get them moist. Although the surface of the ball of earth was covered with green moss, the earth underneath was a complete dust. This is the very way in which ericas are lost. I have observed it myself in the countenance of many collections. I am a great advocate for potting not only ericas high, but every hard-wooded plant; but not to such an unreasonable and unnatural height as that one would suppose they were hung up to dry to make fuel of. My own maxim is, with a No. 32. pot, for the collar of the plant to be elevated above the rim of the pot about 2 in. on an average; a No. 2. about 4 in.: of course the other-sized pots in proportion, and when shifted into large tubs allowing a little more. Surely nature never taught us to stick them up to the unreasonable height of 10 or 12 inches above the rim of a No. 8. pot: if so, what utility can the pot be? The expense of the pot might well be dispensed with, if they could be made to thrive that way. I took a bit of stiff wire larger than my pen, and thrust into the balls of earth to allow the water to pass: but, finding I could not get the ball of dust moist, I took a hammer and an iron wedge, and drove the wedge in to make holes. I then put a quantity of broken stones and pebbles into these holes; scraped off the moss; got a quantity of tough rooty heath soil, cut it as I required it with my bench hatchet, and pegged it all over the surface, thrusting plenty of stones, pebbles, &c., between the sods; and, routing out 2 in. with a crooked piece of iron all round the rim of the pots, I filled up the cavity with stones. I very soon had the pleasure of seeing a complete wig of white fibrous roots all through the sods and amongst the stones. I then prepared for fresh-potting them, which was done in the following manner: —

By turning them out of the pots, and chopping off two thirds of the lower end of the ball of earth; well draining the pots, and potting them to any desired height; filling in round, first one third with the crumbs of the potting-bench, with some stones, and a little sand if necessary, and ramming it down tight with a stick for the purpose; then filling up with coarse pieces, stones, pebbles, flints, &c., with occasionally a handful of sand shook in amongst it. As I have before stated, I never make it a rule to mix my compost before using it, for ericas or any choice plants; but use the preparation to the best of my judgment, according to their constitution.

My own season for potting or fresh-shifting ericas is when they are in want of it, no matter what season of the year it is. If they require shifting two or three times in the course of the year they get it; some get shifted in January, others in June, and every other month. They do not all make their growth at the same season; therefore I do not consider they require all potting at the same time, although I have heard my grandfather used to fresh-pot all his in the month of March.

I must tell you how perplexed I was about the E. Massòn*ii;* its appearance was so bad I considered it a hopeless case. I left it standing aside, considering in what way I could deal with it. I was grieved to see it in such a deplorable state. One evening after the men had all left I made up my mind to do something with it, and, on turning it out of the pot, every particle of earth fell from it; not a single root to it. I was in two minds about casting it on the rubbish heap. You may judge my grief; I certainly never can forget it. However, I cut it back; potted it, in soil I fancied, into a rather small pot; placed it in the corner of a cold-pit; and very soon had the pleasure of seeing it breaking abundance of young shoots. It grew vigorously, soon wanted a larger pot, and is at this time in a No. 2. pot. Its next shift will be into a large tub. This is the very plant you admired; and it was described in page 621., in the December Number of your Magazine.

I find that by potting them in coarse sweet soil, with plenty of pebbles, or some rough, uneven, knobby flints; part of the drainage coarse charcoal, and a few pieces of charcoal put in here and there in the progress of potting, to keep all healthy and pure together; there is no fear of their getting soddened with water, or punished with drought. Give them plenty of water in the growing season, and never let them get punished for want of it. In my humble opinion, 99 heaths that die, out of every 100, do so through being punished for want of water. If they are properly drained, potted, and watered; taking care to give them abundance of air at all times, night and day, if possible; and giving them a good washing with the engine or syringe often, when in a healthy vigorous state, of a fine morning; I will warrant that they will be preserved in health and vigour, clear from mildew and every other pest. The house they are growing in should be kept well washed and cleansed; for no plant that I am acquainted with enjoys cleanliness more than heaths do. Fire heat they do not relish by any means, no more than they do confinement. If at any time it is necessary to have fire of a frosty night, I find it also necessary to give air; if it is but a small portion of a very severe night, it is better than confinement, for a little frost does not punish them so much as closeness and confinement. I have heard practical men observe, "Why! do you syringe your ericas?" — "Yes, certainly. Do you think they never get rain on them in their native country?" I have often seen men make quite a wonder to see ericas syringed, observing that it would be the means of the young wood getting the mildew, damping, and cankering. In my humble opinion, it is a preventive.

I have entirely given up using broken freestone, Portland stone, &c., this last season; finding that in the course of two seasons the heath soil is the means of *perishing* it; that it wastes and crumbles away like old mortar; and that, when exposed to the atmosphere, it is very subject to get green in damp weather, and the roots object to work or run about it. Although it is a great improvement on the old sifting system, there is nothing to be compared with common stones, pebbles, rough knobby flints, &c., such as can be picked up on any common where turf, &c., have been cut.

The whole of the ericas under my care are growing amongst stones, pebbles, knobby flints, charcoal, and a portion of sand, with sods of fibrous tough heath, soil, merely taking the hatchet and chopping off the furze, heath, bushes, &c., and giving the sod a chop or two. No doubt it requires some knowledge and a little taste to pot ericas. I should not exactly like to trust to any man to repot the choice kinds of heaths, although I had made the preparation and given directions. It is my opinion, without a man is fond of his business, and feels an interest in what he is doing or about to do, it is very seldom it gets properly done; for instance, I have seen and heard men, when meeting a plant, fruit, &c., in any way a little superior or out of the common, make enquiries respecting the soil it was produced in: and it has appeared to me that some fancy the only reason they cannot produce things of equal quality is the difference of soil; that is, because they have not the very kind of soil their neighbour has. It is a common complaint that the fault is a bad soil, bad water, a bad situation, or a bad season. It is not often that we hear that it is for the want of knowing what properties the soil and water contain, or that they have been made use of at an improper season without being purified;

nor do they often think of putting their shoulders to the wheel to try to improve the bad situation, or of opening their eyes a little earlier of a morning to try to assist nature at the supposed unkind time of the season. A man may make the most perfect preparation imaginable in his own mind, and then by misapplication be completely deceived; particularly if he does no more to it himself than making the preparation, trusting to other people much; who if they are ever so good and careful, if they do not happen to see the nature of what they are doing, often commit sad errors. Some men appear to follow a business for years without giving their proceedings a candid consideration; but sow when it is spring, and gather when it is autumn, because they observe others do the same, or that their grandfather did the same. However, the time will come when this mode of doing business will not do.

It is pretended by many growers that ericas are a most difficult tribe of plants to manage, in respect to watering; but, if they are potted in coarse soil with plenty of stones, and well drained, using some charcoal over the crocks and a few knobs of charcoal amongst the soil, taking care to have all sweet and wholesome, there is no fear of the plants doing well.

I am fond of a good span-roofed house for heaths, opening on both sides at the ends, and the top lights movable, so that the house can have abundance of air, which may be regulated according to the kind of weather, &c. A house of this description can be aired suitably at all seasons.

Cutting down old naked plants I practise at any time in the season, as I observe any variety requires it. The different varieties making their growth at different seasons is my reason for so doing. The best time is when they are about commencing to make their young wood; and I take care to leave one living branch on the plant, as I find, by cutting down into the old naked wood, and not leaving any living wood, sometimes they will not break. If a plant is properly managed from the first and kept topped, it never requires cutting down.

In commencing tying and training the tall naked ericas, I got some neat stakes made out of double laths and painted them green; and, with some small twine painted and green thread, I brought the heads of the plants down, and trained them round five or six of these small stakes, which was the means of their making generally plenty of young shoots. The next time of training I got them still lower down. I have of late entirely dispensed with stakes, training them in the following manner. I put from five to ten short green-painted stumps, leaving them about 1 in. above the rim of the pot, and run a fine wire round the whole, by which means the plant can be tied neatly down to any required shape: if neatly done, it is scarcely perceptible, and there is nothing more to do. When shifting into larger pots, it is only necessary to cut the wire asunder, and place the stakes near the rim of the pot, adding two or three more, joining a piece more wire, and shifting some of the ties a little. It is very quickly done by an active person; and is not only neat, but very durable.

Propagating heaths is much easier and more simply done than most people imagine. Fill the pots half full of crocks, then add a handful of good rich open heath soil, and about 1 in. of pure sand with a small portion of charcoal dust. Take the most healthy cuttings, cut them clean with a sharp knife, clear off a portion of the leaves, and put them in to the depth of a quarter of an inch, covering them down close with a bell-glass. Take off the glass every morning, wipe it with a dry cloth, and leave it off for half an hour or so, taking care to water them with a fine-rosed pot often; for I have observed thousands of cuttings put in and lost for the want of sufficient water.

Heath-growing may be summed up in a few words. Get good, tough, rooty, gritty heath soil, sweet and wholesome, with a portion of pure sand, stones, pebbles, or flints; a good drainage, with a portion of charcoal used in a rough state. The plants should stand in a healthy airy situation, and be watered with pure water; if the water is not pure, put charcoal in it. Keep them at all times and seasons well aired, and syringed often on a fine morning; it is the life and soul of them.

Bicton Gardens, Feb. 13. 1843.

ART. IV. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 266.)

THE design *fig.* 73. is for a flower-garden combining a shrubbery; the plants, in both cases, to be a miscellaneous assemblage planted regularly, according to height, colour, and time of flowering. In the centre is a basin of water with a stone margin and vases at the angles, the entrance to which is through arches of trelliswork, covered with hardy herbaceous climbers, such as convolvulus, tropæolum, &c., at *a, a, a, a*; or a cypress or conical-shaped Juníperus, or Irish yew, may be planted in each of the small squares at the four openings. The beds are not more than 2 ft. wide, in order to admit of only a single row of plants in each; every plant is to be encouraged to form a circular mass of 18 in. in diameter, leaving a separation of 3 in. between plant and plant when full grown, and the same distance between the plants and the grass, so that in fact each plant will be a circle of 18 in. in diameter, standing within a square of 2 ft. on the side. On the beds next the walk the lowest plants, or those which do not rise above 9 in. or 1 ft., are to be planted; on the next the middle-sized plants which do not rise above 2 ft., and on the third bed, plants which grow from 3 ft. to 5 ft. in height. The plants in each bed may be arranged jointly according to the colour of the flowers and the time of flowering as follows: —

For the line of beds next the walk, eight white-flowering plants for Fe-

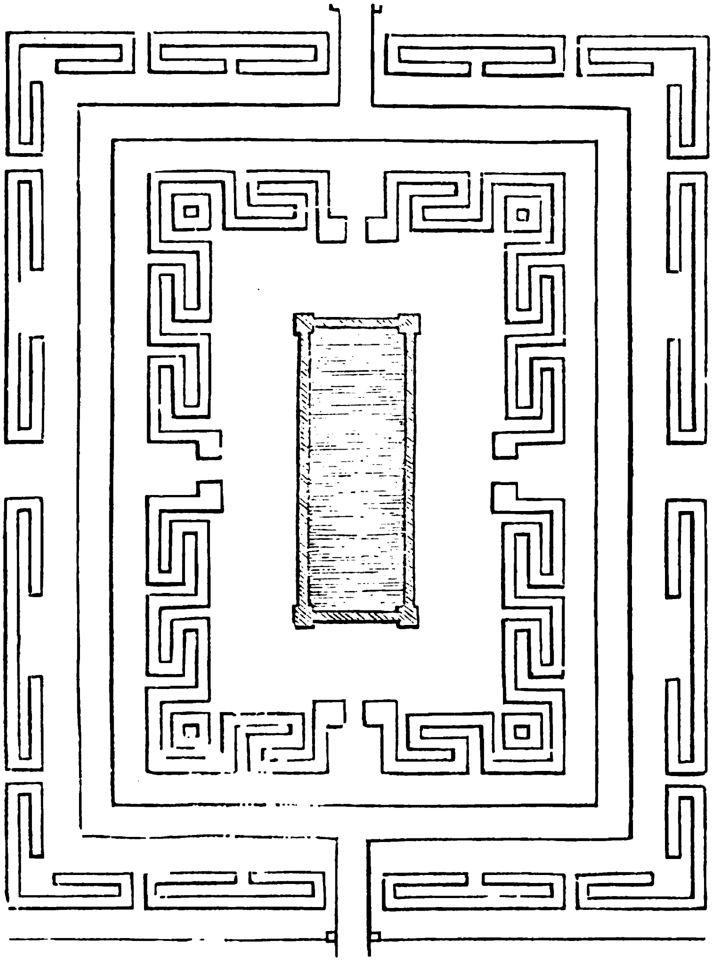

Fig. 73. *A Flower-Garden surrounded by a Shrubbery.*

bruary, March, April, May, June, July, August, and September, planted in succession ; next, eight red-flowering plants for the same months ; and so on, through blue, yellow, purple, orange, and brown, commencing again with white.

The line of beds next the walk being completed in this manner, the second line may commence with purple or orange, and the third with brown. As several of the plants in each colour will continue in bloom more than a month, there will never be any colour wanting. In the middle line of beds there will be no plants for February or March, because there are scarcely any plants which rise above a foot that bloom in these months; and in the third line of beds there will be none for February, March, or April, and only the crown imperial for May, because almost all tall-growing plants flower late.

The beds for shrubs, which are on the other side of the walk, are to be planted in single rows distributed on the same general principles as the herbaceous plants. The first row will contain hardy heaths, low vacciniums, and other ericaceous plants, daphnes, &c., which do not rise above 9 in., of which there are upwards of a hundred species and varieties purchasable in the London nurseries.

The outer bed of shrubs should be planted with taller-growing kinds, chiefly showy rhododendrons and azaleas, kalmias, mahonias, &c.

In both the lines of beds of shrubs care should be taken to distribute the evergreens and the variegated-leaved plants with some degree of regularity among the others; and the same care ought to be taken in distributing the herbaceous plants. Among the latter there are certain white-leaved plants, such as cerastium, some varieties of auricula, some species of gnaphalium, &c., which ought to be equally distributed : and the same care ought to be had with respect to glaucous and grass-leaved plants, such as the garden pink; and evergreen plants, such as the sweetwilliam, the wallflower, &c.

In planting such a garden, whether with flowers or shrubs, it must always be borne in mind that the garden constitutes a regular formal figure, and that the principle of regularity must be maintained throughout. Every herbaceous plant and shrub must be pruned and trained, and taken up and reduced when necessary; so as to form a circle in the plan, and a dome, or semi-globe, or a cone more or less blunt, in the elevation. The lines of beds next the walk, whether of herbaceous plants or shrubs, will be composed of semi-globes or flattened domes; the herbaceous plants in the second row of somewhat pointed domes, the diameter of the base being 18 in., and the highest point of the elevation 2 ft.; while the herbaceous plants in the third row, and the shrubs in the second row, will be trained so as to form sugar-loaf or blunt conical shapes.

To plant such a garden as this botanically, keeping all the species of a genus together, would render it disagreeable even to the commonest observer, because there would be no obvious relation between the mind displayed in laying out the beds and that employed in planting them, between the designer and the executer, the artist and the artisan.

(*To be continued.*)

ART. V. *Result of an Experiment made by Messrs. W. Drummond and Sons to show the proper Depth of Covering for Grass Seeds and Clovers.* Communicated by Messrs. DRUMMOND.

THE following seeds were sown on the 13th of May, 1842, on an open border of light soil, the covering regulated by a frame standing 3 in. in depth at *a b*, and level with the surface at *c d*, the border 4 ft. wide: the white dots show where the seeds have brairded, and the proportionate thickness of the plants in the different depths; thus proving to a certainty the great loss sustained by the ordinary mode of covering, or rather burying, the seeds.

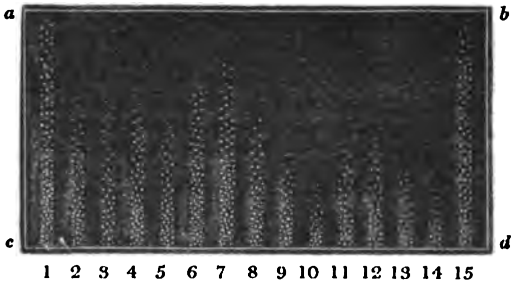

Fig. 74. *Diagram showing the Growth of Grass Seeds sown at different Depths.*

1. Perennial rye grass; 2. Timothy grass; 3. Meadow fescue; 4. Red clover; 5. White clover; 6. Yellow clover; 7. Rib grass; 8. Meadow foxtail; 9. Hard fescue; 10. Smooth-stalked meadow grass; 11. Cocksfoot; 12. Crested dogstail; 13. Wood meadow grass; 14. Fiorin; 15. Italian rye grass.

The perennial rye grass alone has grown at 3 in. deep; but after 1½ in. the plants decrease more than half.

Agricultural Museum, Stirling, April 27. 1843.

REVIEWS.

Art. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

Treatise on the Tank System of communicating Heat to Horticultural Structures. By W. E. Rendle, F.H.S. With eight wood engravings, 12mo, pp. 56. London and Plymouth, 1843.

The long extract from the *Gardener's Chronicle*, in favour of the tank system of heating as developed by Mr. Rendle, which will be found in a subsequent page, renders it unnecessary to express here our entire approbation of it. In this little book Mr. Rendle has shown, by descriptions and woodcuts, how the tank system may be applied to a propagating-house, to a forcing or orchidaceous house, to a botanic stove, to a pine-pit, and to the cucumber, melon, strawberry, and the forcing of moss and other roses. *Fig.* 75.

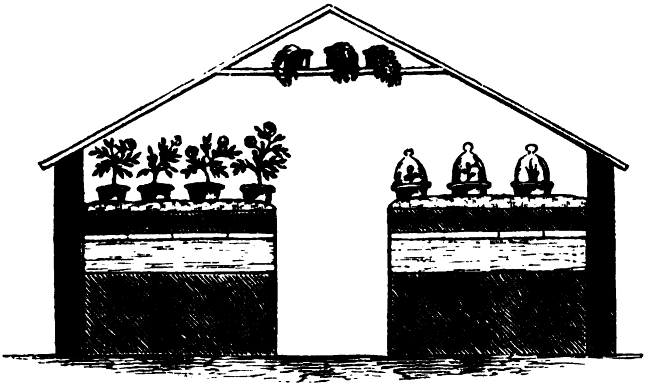

Fig. 75. *Section of a Span-roofed House heated according to Mr. Rendle's Tank System.*

kindly lent us by Mr. Rendle, exhbits a span-roofed propagating, forcing, or orchidaceous house, which is in fact suited for any kind of plant requiring bottom heat. " In lieu of a wooden tank, one of brick or stone, coated with Roman cement, would here answer well. The cistern is represented as being fixed on a solid base of masonry, which, in this instance, I would recommend to be at least 12 in. in depth, so as to contain a very large body of water; for, the larger the body of water, the longer of course the continuance of heat, while I question very much whether the fire would require attendance more than once a day. The slates with which the tanks are covered should rest on a brick partition, over which may be a layer of sand, sawdust, or any suitable material, into which to plunge the pots. The water may be contrived to pass from the one side of the path to the other, by means of an inverted siphon passing under the pathway."

When we visited Mr. Rendle's nursery in September last (see our Vol. for 1842, p. 546.), we were shown one of these tanks, but Mr. Rendle not being at home, and besides being in a great hurry, and having before seen at Bristol tanks of water heated by steam, in order to produce bottom heat, Mr. Rendle's tank did not make that impression on us which might have been expected. Count Zubow's tank heated by steam, and also those in the Bristol Nursery, will be found figured and described in the Horticultural Society's *Transactions*, and in the earlier volumes of the *Gardener's Magazine*.

Remarks on the Management of Orchideous Plants, with a Catalogue of those in the Collection of J. C. Lyons, alphabetically arranged, with their native Countries, and a short Account of the Mode of Cultivation adopted. 12mo, pp. 96. with several woodcuts. Ladiston, Ireland, 1843.

The author, in a printed circular which we received with his book, has directed our attention to what he calls "his Oniscamyntic [*oniscus*, the woodlouse, and *amunō*, to repel] Epiphyte Stand," which, among other merits, has that of being easily formed by every gardener for himself.

" Procure from the potter a pan generally known as a feeder, with a raised centre and a hole in it, into which the forked branch of a tree is to be made fast. In the forked part, the plant is to be fastened with zinc or copper wire, and the roots covered with moss. The branches can be cut to any desired length, so as it does not overbalance the bottom. I have them from 12 in. to 36 in. long. The bottom of the feeder should be made thick and heavy, which will cause it to stand steady and firm. They may be made of different sizes, and the branches cut to different lengths. Should the plant increase in size and weight so as to become unsteady, a larger bottom can easily be substituted. I have several plants of Oncídium, Papílio, Stanhòpea, Læ'lia, and Catasètum, &c., growing in the forked branches, which succeed remarkably well; the foliage of all the plants so grown is much more luxuriant, and of a darker and richer green than those grown in lumps of peat, and at this moment (November) the branch of the tree is covered with the roots firmly attached to it, having in many instances penetrated the bark. They were, until the idea of the stand in their present state occurred to me, fixed in common pots, made steady with yellow clay pressed hard; but those in the stands are much preferable, as they contain a quantity of water in the feeder, which prevents the attacks of insects, and also contributes to the moisture of the atmosphere by evaporation. I am strongly of opinion they will be found an excellent improvement on pots for almost every *Epiphyte*, and will not occupy more space; besides, they have the advantage of allowing smaller plants to be placed between them.

" I strongly recommend the feeding-pans to be procured from Mr. John Thompson, Annfield Pottery, Glasgow, who executed my order with neatness and dispatch."

The work contains various remarks on culture, extending to 32 pages, illustrated by woodcuts; and the remaining 64 pages contain a monthly calendar. We were surprised to find, in p. 21., the author deriving the word Epiphyte from *epi*, upon, and *fuo*, to grow, instead of *epi*, upon, and *phyton*, a plant, as given in various botanical and gardening works. We have no doubt the work will be found exceedingly useful to the inexperienced in the culture of Orchidàceæ.

A Treatise on the Growth of the Peach upon the open Wall. By John Smith, Author of " Treatise on the Growth of Cucumbers and Melons." 12mo, pp. 112, and three plates. London and Ipswich, 1843.

This is a sensibly written treatise by a gardener of much experience, and it may be safely recommended to the younger brethren or the amateur. Zigzag or serpentine walls Mr. Smith decidedly disapproves of, having in his youth had experience of several hundred yards of them. " Instead of their affording a quiet shelter, and inducing a general warmth, they are calculated to encourage so many eddies and sudden gusts of wind, that cold and bleakness are induced." "The best line for a garden wall is most certainly a straight line; and the best aspect for the peach the south, or the S., with but little inclination to either E. or W., especially the latter." (p. 62.) "The height of the wall may vary from 8 ft. to 14 ft. Walls in cold bleak situations may be sunk below the general surface of the garden, as they are at Walton, the marine residence of R. D. Alexander, Esq., near Felixtow in Suffolk," [and at Silverton Park (p. 242.) in Devonshire]. Great care is requisite in this case thoroughly to drain the border. "A border only 6 or 8 feet wide, entirely devoted to the peach, is much better than one twice that width not so devoted, that is cropped with deep-rooted and strong-growing vegetables." (p. 67.) Wherever peach trees are worn out, the soil will be found to be no less so, and the one requires to be renewed no less than the other. The wavy fan mode of training "embraces one very good principle, and at the same time one of the very worst which can possibly exist. The good is that of elongating and elevating the under leader; the evil is that of encouraging a number of shoots upon the upper side of this leader, within the bosom of the curve, to be produced and reproduced one above another; every one, as it is encouraged, becoming stronger than its producer, until the leader's life is sucked away by them, and its amputation rendered unavoidable." The common fan mode of training, so universally practised, is what Mr. Smith prefers to all other modes, elevating occasionally the extremities of the lower shoots when it is necessary to add to their strength.

Copious and frequent watering Mr. Smith considers essential to the growth and fruitfulness of the peach, and this, we believe, is also the opinion of Mr. Smith of Hopeton House Gardens. "The very finest and best Grosse Mignonne peaches I ever saw were grown by my friend and neighbour, Mr. William M'Credie, some years since, in a garden at that time occupied by him; and their superiority, it is certain, arose from the constancy of the supply of moisture, communicated by means of a considerable-sized stream of water, which ran immediately at, and in close contact with, the north side of the wall against which the tree was planted. Again, the Barrington peach, cultivated under circumstances differing from the above, by the water being at the back of the wall, and stagnant, foul, and rising considerably above the surface of the soil on the south side, but removed in the latter end of the season, has been known to succeed admirably.

"There is in the mind of many gardeners an idea that dry, very dry situations are most favourable to the growth of the peach, and especially that there they are not liable to the attack of mildew; this, however, is a mistake, for in such places, and without a good supply of water being afforded, this tree is as liable to infection from that disease as in any situation whatsoever; and indeed I have witnessed its existence upon a lofty and dry situation to a most deplorable extent, even while under the care of gardeners of no mean talent. I have also known one who, differing from them on the cause of mildew, ventured to recommend copious watering as the principal means of removing the pest. This course they adopted, and the result has been most satisfactory. That the application of an abundance of water to cold soils, &c., or in seasons which are unusually dull and cool, would be proper, let not any one suppose, for this would indeed be the extreme of absurdity. There should, under every circumstance connected with human operations, be cherished in the mind of the operator a due regard to that equilibrium which is so essential to the well-being of all created things." (p. 97—100.)

"Were it needful still to enlarge upon the propriety of administering large quantities of water in a skilful manner, and on the beneficial effects thereof, the trees upon the walls of R. N. Shawe, Esq., of Kesgrave, between Ipswich and Woodbridge, under the management of my friend Garrod, gardener at that place, might be referred to as an undeniable proof; for there the element exists in abundance, and runs in a large stream continuously just in front of, and at a few feet distance from, one of the principal south walls; the peach and other fruit trees at the same time testifying that it does them no injury. The trees in this garden are generally fan-trained, and, though perhaps past their zenith, afford proof of no mean description in favour of that system.

"In addition to the preceding remarks, I would say, let the operation be done judiciously; by which is meant: — First, with water which has been exposed to atmospheric influence for a considerable time, say not less than twenty-four hours. Secondly, when the leaves, &c., are to receive the benefit of this element, by its application from the garden engine, let it be water simply; and by no means wash them with lime-water, for, if this be done, the probability is that an abundance will run down upon the bole of the tree, and the effect will be very injurious, though the cause of the mischief may not always be understood. I have known trees, the main stems of which have been bared of their bark on the part where the liquid ran down, from no other cause than this; but at the first I could not imagine from what source the evil had originated. Thirdly, in hot weather, let the operation be performed seasonably, that is, in the after part of the day, when the sun is declining from, and not when it is shining fully or powerfully upon, the wall. Fourthly, when the soil alone requires to be watered, let it be remembered that one good doing will be of more service than several 'make-believes.' My own method is to prepare a trench at some distance from the bole of the tree, and, if the weather be hot, and the soil becoming dry, to pour the water in by wholesale, until the soil is completely saturated; and, when the whole is passed away into the ground, the disturbed part is relevelled, and made to appear as if nothing of the sort had been done; thus the sun's influence upon the moistened ground is beneficial, whereas, were the surface exposed in a moist state, it would be injurious [by the cold that would be produced by the evaporation of the water]. Such a watering as this, taking place shortly after the stoning is over, need not be repeated during the season; but the surface of the border should be kept quite clean, and raked with a wooden rake at least twice every week, in order that the atmospheric and solar influence may be duly received, and thereby the perfect maturation of the fruit promoted." (p. 101—103.)

Mr. Smith protects the blossom buds in spring, and the article he prefers for that purpose is bunting. "During fine days it should be removed, and when the fear of frost is passed for the season, it must be taken away entirely." Syringing about sunrise after frosty nights he has also found an efficient substitute for coverings. An alarm bell, attached to ingenious and yet simple machinery, is described and figured, the object of which is to detect "fruit-gatherers who have little regard to principle."

The reader will see from these extracts that this is a valuable little manual of peach culture.

Hortus Collinsonianus. An Account of the Plants cultivated by the late Peter Collinson, Esq., F.R.S., arranged alphabetically according to their modern Names, from the Catalogue of his Garden and other Manuscripts. Not published. Swansea, 1843.

This is a catalogue with annotations, prepared from Mr. Collinson's copies of the sixth and eighth editions of Miller, and from other sources, which were in the late Mr. Lambert's library, and were purchased at its sale by L. W. Dillwyn, Esq, F.R.S., L.S., &c., of Skelly Hall, near Swansea. In printing it this botanist has rendered an acceptable service to his botanical friends, and through them, for the work is not sold, to the public. Under our article entitled *Arboricultural Notices* will be found some interesting extracts, which may be considered as supplementary to the historical part of our *Arboretum Britannicum.* In p. 59 and 60. there are some memoranda relating to the fruit and kitchen garden, which we shall have recourse to when we prepare a new edition of, or a supplement to, the *Encyclopædia of Gardening.*

A Catalogue of Sicilian Plants; with some Remarks on the Geography, Geology, and Vegetation of Sicily. By John Hogg, Esq., M.A. 8vo, pp. 51. London,

1842. Extracted from the "Mag. Nat. Hist.," and from the "Annals and Mag. Nat. Hist."

There are many plants enumerated in this catalogue that would form very desirable additions to the British garden. Among the trees and shrubs there are several, which, if they have been introduced, are now lost, or rare, and of these we shall give a list under our Arboricultural Notices.

Thorburn's Catalogue of Kitchen-Garden, Herb, Flower, Tree, and Grass Seeds, Bulbous Flower Roots, Greehouse Plants; Gardening, Agricultural, and Botanical Books, Gardening Tools, &c., for 1843. 12mo, pp. 68. New York.

Parsons and Co.'s Catalogue of Fruit and Forest Trees, Ornamental Shrubs, Plants, &c., for 1843. 8vo, pp. 40. New York.

Rendle's Catalogue of choice Geraniums, Dahlias, Pansies, Fuchsias, Calceolarias, Greenhouse, Hothouse, and Herbaceous Plants, Camellias, &c., for 1843. 12mo, pp. 25. Plymouth.

Each of these catalogues is a very copious list of the plants and seeds of commerce.

Timely Hints, addressed to the Landlords and Tenantry of England, Scotland, and Ireland; showing, in a few Words, the only obvious, easy, and certain Means by which they can severally continue to derive and pay fair Rents from the Soil, under the present certain, and prospective possible, Depreciation in Value of British rural productive Industry, &c. &c. By their "Country Cousin." Pamph. 8vo. pp. 46. London, 1843.

According to this author the present backward state of agriculture is mainly owing to the well-known incapacity of lawyers as managers of landed property; and his remedy consequently is, the employment of resident stewards or agents, who have received a competent, general, and professional education. The pamphlet contains a great variety of quotations, authorities, and opinions, all bearing on the subject of the title, and tending to show that all the present difficulties of landlords and tenants are to be overcome by superior cultivation.

Letters to the Farmers of Suffolk. By the Rev. J. S. Henslow, M.A., Rector of Hitcham, and Professor of Botany in the University of Cambridge. London and Hadleigh, 1843.

We take much blame to ourselves for not having before noticed the extraordinary exertions which Professor Henslow is making in Suffolk for the advancement of agriculture. These exertions commenced with some lectures on the nature of plants and soils and manures, delivered at different times in the course of the last two years to the farmers, his parishioners, and they have led ultimately to the publication of the pamphlet before us, the history of which is thus given.

"These letters were published in three of the county papers. Their object was to direct the attention of the farmers of Suffolk to the great importance of conducting their experiments in such a manner as might render any results obtained by them available to the progress of science, and consequently to the more rapid improvement of agriculture. With this view, an extensive systematic cooperation has been strongly insisted on; and the success which has attended one appeal for the trial of a particular experiment, to be undertaken by not less than fifty experimenters, has led to a persuasion that it would be very easy to organise a system of experimental cooperation among a very large body of the farmers of all England. I have, therefore, determined on republishing these letters, with the addition of a few notes, and a glossary of terms, in hope they may be serviceable in persuading others to imitate the example of my own neighbours. As I am not to be personally benefited by the sale of this publication, though I bear the expense of it, I have no scruple in requesting my personal friends, acquaintances, and correspondents, to assist me in promoting its circulation as widely as possible. They will find a confident hope expressed in it that some scheme will shortly be organised for securing the object which is there suggested, and which has received the approbation of persons well competent to judge of its importance and practicability. The pamphlet includes also an address delivered last December to the Hadleigh Farmers' Club, on the theory of manuring; and the letters discuss, in a popular manner, the functions of the leaf, and a few other topics which may be considered of general interest to practical agriculturists.—*J. S. Henslow. April* 27. 1843."

We most strongly recommend this pamphlet, not only to every one interested in agriculture, but to the gardener and the scientific amateur.

On the Laying out, Planting, and Managing of Cemeteries; and on the Improvement of Churchyards. With 60 Engravings. By J. C. Loudon, F.L.S., &c. 8vo, pp. 120. London, 1843.

The whole of what is contained in this volume, with the exception of three lithographic plates, will be given in the *Gardener's Magazine*. Four articles have been published, and there remain five to be given, so that the last will be in the November Number.

A History and Directory of the Borough of Derby, intended as a Guide to Strangers visiting the Town. By Stephen Glover. 8vo, pp. 256, numerous woodcuts. Derby, 1843.

This work is judiciously drawn up, and it is illustrated by numerous woodcuts, exhibiting views of the churches, and all the more remarkable buildings, of tombs, antiquities, and of the buildings erected in the Derby Arboretum. It also contains plans and sections of the Arboretum, a description of it, and an account of the gallery of paintings, sculpture, &c., in the residence of Joseph Strutt, Esq., the benevolent founder.

Restoration of the Church of St. Mary, Redcliffe, Bristol: An Appeal by the Vicar, Churchwardens, and Vestry; with an Abstract of Reports by Messrs. Britton and Hosking; and an engraved Plan and Views of the Church. 4to, pp. 28. Bristol, 1842.

The engraving of the restored church is very handsome, both in regard to design and execution, and we trust funds sufficient will be raised for carrying the improved building into effect.

The Latin Governess, a Manual of Instruction in the Elements of Latin, for the Use of Teachers of Latin generally, but more especially of Mothers and Governesses. By John W. Freese, B.A. 12mo, pp. 163. London and Westerham, 1843.

This work is quite original in its plan, and, though intended chiefly for governesses, yet we think it also well adapted for the self-instruction of young gardeners. It is much to be desired that some amateur botanist and gardener, who is a classical scholar, would write a Latin grammar expressly for practical gardeners; illustrating it as far as possible by passages taken from the specific characters and descriptions of plants, with just enough of syntax to enable the student to read botanical works, which are frequently written in Latin. Such a grammar, and a short selection from these works, embracing all the difficulties likely to occur, would form a complete course for the practical gardener.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Juckes's Smoke-consuming Furnace, which may be seen in action at the Manufactory, "the Grove," Great Guilford Street, Southwark, consists of a series of bars attached together so as to form an endless chain, which traverses over two drains, the one placed at the back and the other at the front. These fire bars traverse at the rate of about 6 ft. per hour, and only require a power about one thirtieth of a horse to keep them in motion. The fuel being introduced on the bars at the entrance, through a hopper, is carried onwards by the traversing motion of the bars, passing through all the relative stages of combustion until nothing but the scoria or unvolatilisable portions remain, which are rejected at the back. It will be seen that in this arrangement, when the fuel is first introduced, it parts with its more volatile portions, which are consumed with the fuel farther advanced on the bars, and consequently in a more perfect state of combustion. By this process all the carbon is burnt, instead of being distributed in the atmosphere, which is at once seen by the total absence of smoke in the chimneys of the furnaces where it is employed. This is of itself a great saving in the economy of fuel; but another equally important is in the fact, that the coal dust or refuse coal answers all the purposes of the largest and best coal. Through the constant admission of atmospheric air between the fire bars, the heat of the furnace is constant and uniform, and there is no clinkering of the bars, which come out of the fire as clean in the evening as they did when they entered in the morning. The hopper, which supplies the fuel, may be made to contain a supply of fuel for an unlimited time; and thus the regulation of the fire is rendered quite independent of the caprice or neglect of the stoker.

This furnace appears to be interesting to the gardener in two ways: 1st, because the general adoption of some such arrangement, where the important object of effecting the combustion of smoke is accomplished, would tend greatly to improve the purity of the atmosphere, and prove beneficial to the cultivator; and, 2d, as it might be economically and advantageously employed in heating houses upon a large scale, particularly with the hot-water apparatus. — *A. B.*

The Tree-Creeper (Cérthia familiàris) and the Green Fly that infests Geraniums. — Once upon a time one of the little birds called tree-creepers entered a small greenhouse, and took up its abode therein for a day and a night, at the end of which time it had cleared the plants of insects most completely. Not a leaf nor a twig escaped its searching glance. As its scientific name implies, it was quite tame and familiar, and never seemed to heed the intrusion of strangers, but still continued to carry on its work of destruction. But, alas! on the second morning the voracious little bird was found lying stiff and cold in the corner which it had fixed on for its bed, having, in fact, glutted itself to death. Gardeners, if you wish your greenhouse plants to be free of insects, encourage the Cérthia familiàris when you have it, and try to procure it when you have it not. — *A. S. M. Braes of Gowrie.*

Wireworm destroyed by the Mole. — A singular instance of the utility of protecting the mole has within these last few days come under my observation. Having had occasion to turf up a number of small clumps in our flower-garden, I was astonished in a few days to find that the moles had pushed up the turf over the whole surface of some of the clumps. I immediately searched for the cause of their visit to these patched up clumps; when, to my astonishment, I found the wireworm in great abundance between the surface of the former clump and the new-laid turf. They had, I suspect, been in the turf before it was laid down, and, the ground beneath being beat so hard, they could not penetrate farther; where the moles, having once discovered them, seemed determined on eradicating them. They were mostly the larva of Agriòtis lineàtus, with a few of A. obscùra. What was very singular in this instance is, that before this time I never saw a single indication of a mole in the garden, although there were plenty of them in the wood which surrounds it. — *John Dunlop. Worcester Park Gardens, near Kingston, May* 10. 1843.

Cýtisus Adàmi, Purple Laburnum. — I write to communicate to you a further freak of this singular plant. The tree of my brother, Mr. Algernon Herbert, at Ickleton, near Saffron Walden, having for some years ripened seed on both the yellow-flowering branch and the small-leaved purple-flowering branch, has, this year, in addition to these eccentricities, produced small solitary axillary purple flowers in that part of the tree which has retained the original hybrid character. Some of the seedlings from the yellow branch have flowered, and are natural yellow laburnums. One from the small purple branch at Spofforth has rounder leaves than *Cýtisus purpùreus*, but has not yet flowered. I regret the loss of one seedling from the yellow branch, which showed a purple tint on the young wood, and would probably have manifested some diversity in the colour of its flowers. The habits of this plant are not those of a seminal mule; and I entertain little doubt of the correctness of my surmise, that it was produced by the cooperation of the cellular tissue of the two species in forming the bud on the suture where the bark had been inserted in budding. — *W. Herbert. May* 18. 1843.

Johnston's improved portable Garden Engine (*fig.* 76.) is formed on exactly the same principle as that of Mr. Read, figured in our Volume for 1837, p. 459. The principal difference is, that Mr. Johnston occupies two cylinders with what Mr. Read includes in one. The following is the description sent us by Mr. Johnston. On raising the handle *a*, the water passes up the lower tube, opening the valve *b*, and filling the tube *c*. Depressing the handle closes the valve *b*, and opens the valve *d*; the water passing up the tubes *e* and *f*, and compressing the air in the outer tube *f*, when it continues up the tube *e* to the joint *g*, through which it passes out at the jet, with or without the rose *h*; the joint being movable up or down. On the handle being raised again, the valve *d* closes, and the valve *b* opens for the water to fill the tube *c*. At the same time that the tube *c* is filling, the air compressed in the tube *f* is expanding, and forcing the remaining water in the tubes *e* and *f* to flow out of the jet. This process being repeated at each stroke of the pump, causes a perpetual stream, which may be thrown out 60 ft. The conducting tube *k* screws off at *i*, rendering the instrument extremely portable. The instrument itself is very handsome, and well adapted for lady gardeners. — *Cond.*

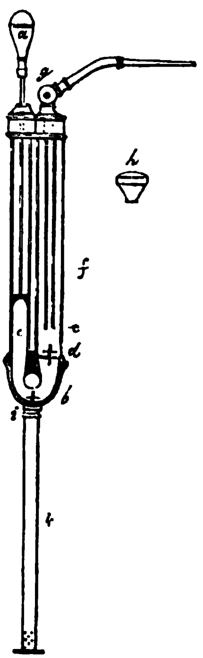

Fig. 76. *Section of Johnston's improved portable Garden-Engine.*

Cìcer arietìnum L. — I send you some seeds of *Cìcer arietìnum* collected at Athens in 1842. It is an excellent vegetable, and remarkable when growing for the whole plant being covered with a secretion of oxalic acid in a liquid state. I never saw it in crystals, as stated in the *Penny Magazine*. — *W. C. T. May* 13. 1843.

Improvements in Garden Pots. — In a valuable article on this subject in Paxton's *Magazine of Botany* for March, the glazing of pots is objected to as assimilating them to culinary utensils, and as interfering with the pictorial effect of vegetation, for which a dead or dull quiet surface is justly said to be much more appropriate than a shining one. "In reference, however, to the health of the plants, experience is most decidedly in favour of the hardest pots. The less porous the material, the less likely is it to become sodden or saturated with water, or to carry off moisture with too great rapidity in the burning heat of summer. Soft thick pots that are imperfectly baked are universally discarded by good cultivators, and those which are hardest and thinnest preferred. Pots or tubs of slate are found, likewise, to be excellent receptacles for most plants; and hence we discern nothing but that which is fitted for proving beneficial to plants in the idea of glazed pots; but, as their hardness and closeness may almost be realised without the glazing, we deprecate their use on account of the appearance." (p. 42.)

The author after noticing Mr. Brown's hollow-sided pots, which he thinks (with the improvement of the hole for the admission of the water made outside the pot instead of inside) are particularly suitable for plants which require a great deal of water in summer, and whose foliage is not low, or ample enough to shade the plants from the rays of the sun, such as Tropæ`olum tricolòrum and T. brachy̆ceras, suggests three improvements. These are: less depth in proportion to the width; a better drainage by means of more holes in the bottom; and the admission of air through the drainage holes, by raising the pot above the surface on which it stands by means of feet, or, in other words, carrying down the sides of the pot an inch or two below the bottom, and making two or three notches in the prolonged part. "That shallow pots are of the utmost importance to flowering plants in promoting their beauty, every day's observation more and more fully convinces us. No gardener would now think of letting his vines or his peach trees have a border as deep as it is broad, or, in other words, suffer their roots to extend downwards as far as they do horizontally. He would at once anticipate (and justly) a failure in his crops from such a proceeding. And yet the cultivator of exotics takes a course which is quite as unwise when he puts his plants in pots that have the same depth as diameter. The grand rule in all culture, whether for fruit or flowers (for the means that will produce the former must bring the latter), should be to keep the roots near the surface; and this can only be done by positively preventing them from descending, for it must be recollected that all roots have naturally a downward tendency. In order to accomplish this end with potted plants, there is no other way of proceeding than by making the pots shallower; and in this, we are persuaded, lies the art of flowering plants quickly and well. It will repress straggling and rampant habits, and, with a state of beautiful dwarfness, produce an unusually liberal flowering condition. We are greatly mistaken if the Chinese are not better philosophers than we are on this point; for we believe they plant their curious stunted trees in exceedingly shallow pans of porcelain." (p. 44.)

Hunt's improved Garden Pots and Saucers, of which *figs*. 77. and 78. are specimens, are well calculated to accomplish two of the desiderata mentioned in the foregoing paragraph, viz., improved drainage, and the admission of air; and they are also adapted to prevent the entrance of worms. *Fig*. 78. shows a pot with the improved bottom, which may be used with or without a common saucer; and *fig*. 77. shows the improved saucer, with which any common pot may be used. Two or three holes in the bottom of the pot instead of one, and an increased width in proportion to the depth, would, as the writer in Paxton's *Magazine* observes, be great improvements to these pots, and we have no doubt they will be made without delay by Mr. Hunt. Even as they are, they are obvious improvements on the common form; and the additional cost, when made of the common material, is only 1*s*. 6*d*. per cast. Ornamented pots of this kind, made either of the common material, or of a beautiful cream-coloured clay obtained from Teignmouth in Devonshire, are also manufactured by the same parties. For greenhouses, and for plants in rooms, this last description of pot, combined as it is with the improvements described, will be a great acquisition.

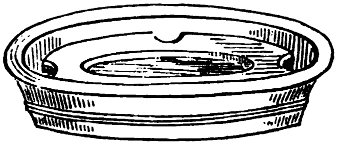

Fig. 77. *Hunt's improved Saucer.*

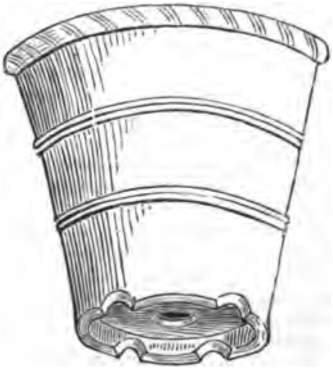

Fig. 78. *Hunt's improved Garden Pot.*

The new Method of potting Plants, or One-Shift System, promises to be the greatest step ever made in the progress of pot culture. A previous advance was made forty or more years ago, when the frequent-shift system was adopted instead of annual shifting or repotting. Previously, plants in pots were seldom shifted or repotted oftener than once a year, except in the case of balsams and a few other tender annuals, which received two or three shifts. Subsequently these shifts became much more frequent, so that when a balsam or a cockscomb was required to be grown to a great size, it was first planted in a pot of an inch or two in diameter, in rich finely sifted soil, and gradually shifted, as soon as the roots reached the sides of the pots, from one pot to another a little larger, till at last, when nearly full grown, it was in a pot of a foot or more in width. A similar practice was general with all plants whatever, even including heaths, that it was wished to bring forward rapidly. The results of this mode of culture have in general been highly satisfactory, and the chief objection that can be brought against the system is, the time and labour required. A second objection is, that water does not escape so freely, and consequently air does not follow it so readily, as when plants are growing in the free soil. This last objection is completely got over by the one-shift system, the essence of which consists in the employment of rough, turfy, lumps of soil along with fragments of stone, wood, charcoal, or other matters which keep the soil thoroughly open, placed, of course, over abundant drainage.

The one-shift system is said to have been first "struck out" by Mr. Wood, late foreman in the nursery of Messrs. Backhouse of York, and for the last two years foreman in the nursery of Messrs. Henderson of Pine-Apple Place. The dawn of Mr. Wood's invention may, perhaps, be found in Mr. Knight's chopped green turf (*Physiological Papers*, p. 243.), and Mr. M'Nab's "wide-meshed riddle" and large pots or tubs (*Cape Heaths*, p. 20. and 23.); and, from the Letters on Bicton Gardens in this Magazine, and the *Suburban Horticulturist*, p. 616. and 706., it appears that Mr. Barnes has been in the habit of using rough, rooty, unsifted soil in potting for upwards of twenty years. The following account of the invention by Mr. Wood is from an excellent article in Paxton's *Magazine of Botany* for March, 1842. "It appears to have occurred to him [Mr. Wood] that, as plants flourished with such amazing vigour when planted out in a bed, and, if judiciously exposed and drained, flowered also in the greatest profusion, it would be a most desirable object to give them the same means of attaining an early and luxuriant maturity in pots; seeing that, in many places, there is no convenience for having appropriate borders or beds in plant-houses, and, where there is, the specimens cannot be so easily controlled, nor are they at all portable. Numerous experiments, both casually and designedly made, had shown that, by the common way of potting, no such ends could be brought about; since plants which were placed in pots very considerably larger than those which they seemed to require almost invariably suffered, to a greater or less degree, from the stagnation of water in the soil. And, as this accumulation evidently formed the chief obstacle to the adoption of large pots for the smallest plants, it was very justly thought that any thing which could be employed to drain effectually the entire mass of earth, so that no water could stagnate therein, would give the means of allowing young plants in pots all the benefits which they would derive from being planted in beds. Following out this notion in a practical manner, small specimens were shifted from what are called 60-sized pots to those which were 9 in. or 1 ft. in diameter; using a turfy fibrous soil, divested of none of its rougher matters, and mixing with it a quantity of broken sandstone, in pieces from a quarter to half an inch square. By the united aid of the turfy and vegetable matters in the soil, and the fragments of stone scattered throughout its substance, it was thus kept porous and open, without even a tendency to become hardened, consolidated, saturated, or sour; and the plants throve in it with the rapidity and health of those which were placed in a border, while, being situated nearer the glass, and more subjected to the agency of air, &c., they began to flower much sooner, and more abundantly." (p. 37.)

After pointing out the great advantages which will attend this system of potting, the following judicious practical details are given.

"The main point to be observed in potting plants, according to this as well as the customary mode, is to drain them thoroughly. To do this properly, it is requisite that a thick layer of broken pots or ashes, or some such material, be put in the bottom of the pot, and not merely a few pieces of potsherd. There should be at least an inch of drainage, and over all this should be spread a small quantity of dry moss, or a few lumps of very turfy peat or loam, in which all the vegetable matter is dead, but which contains a good deal of woody fibre. Either of these substances will assist the passage of the water, by preventing the fine earth from getting down amongst the drainage and stopping up its interstices, while they will also, by retaining some degree of moisture in themselves, keep the roots cool and damp whenever the earth happens to get excessively dry. What is of nearly equal consequence is the texture of the soil. It should by no means be reduced, pulverised, or sifted, any more than as the first of these may be needful. Vegetable fibre, and stones that are not too cumbersome, should be suffered to remain. Where heath-mould is employed, it ought to be full of roots, and be left, to a large extent, in rough irregular lumps, about an inch or so in breadth. There is infinitely too much preparing and manipulation in most composts; and the freedom with which heaths root into lumps of turfy peat shows at once that they would be more at home if potted entirely into something approaching to the natural texture of the soil in our heatheries or moors. The same principle will apply to all soils, and this constitutes a valuable part of the system of potting we describe.

"A further part of the plan is to keep the neck of the plant, or that portion of the stem next the roots, rather higher in the pot than the level of the soil. This is often done with heaths, and is just as useful to other fine-rooted species. It keeps down exuberance, and promotes inflorescence. It saves many a delicate plant from being killed by water; while, by maintaining the vital part in a drier state, it makes them less sensitive to the sudden and casual occurrence of cold in the winter.

"But the process most conducive to the bushiness of the plants is the frequent reduction of their young shoots. This must be very rigidly attended to, when they do not of themselves bear a sufficient number of laterals. It may be that the branches will require stopping three or four times in the first season; but this will occupy very little time, and is of such extreme moment that without it not a few plants would be quite unsightly, whereas, with its aid, they have become the most ornamental of our exotic decorations. Where it is rightly practised, it will almost necessarily cause the removal of all the early flowers; but with those plants that do not need to be thus treated, and with others that continue to show their blossoms despite such pruning, it will be highly advisable to take away all the flower-buds as fast as they appear.

"As to the application of the system, it embraces all flowering shrubs, whether belonging to the stove or greenhouse, but more especially those which have not been produced by art. Heaths, pimeleas, lechenaultias, &c., have all been found to be vastly benefited by it. At present it is not known how long specimens so managed will last after they have begun to flower. We should presume, however, that they will continue in beauty for three or four, or more years, with only a very trifling shift each spring, after the second season, and that they may then be discarded, to give place for similar progeny. The beauty of a greenhouse or stove does not consist in having very large or very old specimens, but in keeping plants of a moderate size that are particularly healthy and lavishly prolific of flowers." (p. 41.)

In a subsequent article in Paxton's *Magazine*, by Mr. Wood himself, we have the following concise and systematic definition of his system.

"In testimony of the approximation of the present age to a comparatively perfect system of cultivation, there is perhaps no instance of higher interest than the one which involves a mode of culture which has for its ultimate object a constitutional maturity of growth, by dispensing with the attendant risk and restrictive influence of intermediate shifts from smaller to larger pots.

"The principle upon which such a course of practice is founded is now being successfully applied by the most eminent cultivators, and the same principle, so easily adapted to the stronger or rooting division of ornamental plants, has also been rendered applicable to those the most difficult to rear.

"It is well known that growers of plants for public competition have often urged the difficulties and disadvantages attending the purchase of plants which may have received a treatment in some respects opposite to that which they are wishful to adopt; and in many instances they have considered it essential to the accomplishment of their object that the plants should have been subject to their system of management from the first, or initiatory, stage of growth. These disadvantages are, however, now being overcome by a mode of potting (subject to a corresponding treatment), which, not unexpectedly, has been a subject of surprise to some, and a stumbling-block to others, who, in asserting its impracticability, because contrary to the ordinary method, have failed to apprehend the principles upon which such a course of practice is founded.

"The rule which is implied in the principle now adverted to may be defined as follows: — that plants the most difficult to rear ought to be removed from their youngest stage of growth into the largest-sized pot in which they are to be exhibited as specimens.

"However opposite to prevalent opinion and practice such arule may appea to those who are unaccustomed to view facts in the light of comprehensive truths, it may nevertheless be proved consistent with the first principles of horticulture, and rendered conformable to general practice.

"Having stated the rule, the following directions are necessary in the mechanical process of potting: — Take a sixteen or twelve-sized pot, place 3 in. of bottom drainage, and fill up with pieces of peat from 1 in. to 4 in. square, filling the interstices with the fibrous siftings of peat and pieces of crocks till the pot is quite full; then plant a seedling or struck cutting of a heath plant of similar habit, give very little water till the plant shoots freely; and in this treatment is contained the only secret in growing fine specimens.

"Such is the most ingenious and easy mode of potting yet offered to the attention of the cultivator; and, though the plan of dispensing with intermediate shifts has been recognised nearly fourteen years ago, yet, for this most successful application of the system, the profession is indebted to Mr. D. Beaton, the gardener at Shrubland Park, near Ipswich, one of the most eminent horticulturists of the present day.

"This novel and original mode of attaining a mature growth in the cultivation of plants may not inappropriately be termed the accumulative system, and involves, by its unique mechanical application of soil, one of the most important and essential desiderata in all systems of cultivation, and without which all efforts to obtain a constitutional vigour and fertility must prove abortive, namely a uniform circulation of moisture." (*William Wood*, in Paxton's *Magazine of Botany* for May, 1843, p. 89.)

Since the above was written we have seen Mr. Alexander Couper, of the Paragon Nursery, Brixton Hill, known to be one of the best propagators in the neighbourhood of London. Observing that he grew his larger plants in rough turfy stuff, and asking how he came to adopt that mode, he informed us that he was taught it during his apprenticeship with Mr. Henderson, at Wood Hall, near Glasgow, nearly twenty years ago. Mr. Henderson, he says, did not practise the one-shift system; but he did not shift his large specimens of heaths, camellias, oranges, &c., oftener than once in three or four years. The meshes of his sieves were of the same width (above an inch) as those recommended by Mr. M'Nab in his *Treatise on Cape Heaths.* Mr. Couper assures us that most, if not all, of the best modern practices in propagating and rearing plants were known and practised by Mr. Henderson before the commencement of the present century, and he refers for proofs to the *Caledonian Horticultural Society's Memoirs.* In Mr. Couper's nursery we observed a number of rare plants which he is propagating rapidly, more especially some of the new hybrid rhododendrons, which he increases by budding and by herbaceous grafting; placing the stocks, after they have received the bud or graft, on heat, and covering them with a hand-glass in the greffe étouffée manner. — *Cond.*

The most economical Mode of dividing a Square Plot of Ground. — I have this year two pieces of turnips, of ten acres each, nearly square, which I intend to divide by hurdles into eight divisions each, for eating on the ground by sheep and young cattle: now it is plain that if I divide them straight across the field, from hedge to hedge, I shall have seven settings of hurdles, of 220 yards in length in each field, making in the whole a length of 3080 yards for setting hurdles at different times.

To save labour, I therefore adopt the method explained in the annexed diagram, *fig.* 79.

Suppose the figure A B C D to be a square field of ten acres, then *a b* will be the first setting of hurdles, *c d* the second, *b e* the third, *c f* the fourth, *b g* the fifth, *h i* the sixth, *b k* the seventh, and *l m* the eighth; in the whole, eight settings of 110 yards each, or 880 yards; in both pieces 1760 yards, or one mile: and the turnips will be eaten in rotation as the plots of ground are numbered.

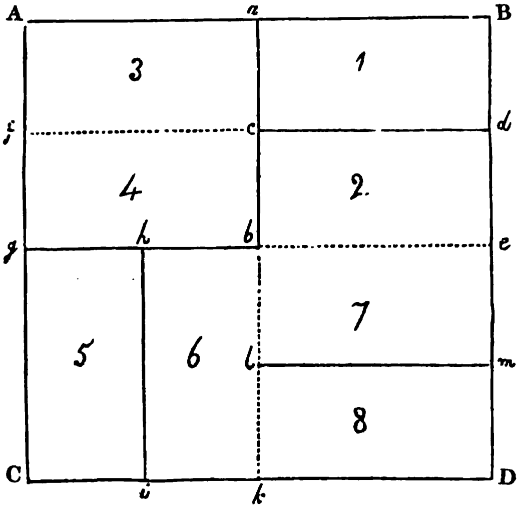

Fig. 79. *Diagram showing the most economical Mode of hurdling off a Field of Turnips.*

		Yards.
Length of hurdling in former way	-	3080
Length of ditto in latter way	- -	1760
Saving of labour	- - -	1320

—(Young's *Annals of Agriculture*, vol. xiii. p. 346.)

This article may afford the gardener and planter some useful hints relative to the division of ground into beds, the sheltering it by hedges, or the distribution of surface or underground drains. — *Cond.*

Scott's Patent Improvements in Cast-Iron, Wrought-Iron, and Soft-Metal Pipes. — Since the vastly extended use, in recent times, of pipes for gas-lighting, and heating by air, water, and steam, a ready mode of joining numerous lengths of pipes tightly together, and of disjoining them again at pleasure, has become every day more and more a desideratum. The old spigot and faucet joint, commonly used for cold-water pipes, was never, even with the aid of the best soldering, a very sound one; and, when applied to pipes constantly subject to heat, or to the pressure of highly elastic fluids, proved utterly useless. The various sorts of flange and thimble joints were found but little better. The cement joints of the butt, mitre, and T forms, now so commonly used by gas-fitters, are, under ordinary pressures, sound joints, and soon made; but, like all joints depending for their tightness on cements, which must be applied in a hot state, they are unavoidably the cause of a good deal of trouble, and of some cost, when one pipe, or any number of pipes, of a series is required to be removed for repair or renewal, or for any purpose of temporary convenience. In the right and left hand screw joint, introduced by Mr. Perkins, mechanical pressure has been substituted with excellent effect for the ordinary cements; but this, too, is liable to the objection that any pipe of a series thus jointed together cannot be removed or replaced without great difficulty. Mr. Perkins endeavoured to obviate this objection by an improvement which he patented a year or two ago, though with but indifferent success. What was still left wanting, by all who had applied their ingenuity to the subject, was, a mode of connexion at once perfectly tight and easily dissolvable; a sort of joint which could with equal readiness be made and unmade, and in the unmaking thereof be attended with little trouble and no expense.

The improvements we speak of are variously modified as they relate to cast-iron pipes, wrought-iron pipes, and soft-metal pipes; but they have this general and remarkable characteristic, that every pipe carries, as it were, its own key, by which it can be made fast and unfast at pleasure; the key, too, so inseparable from the pipe that it can never be mislaid, and a key so simple withal that it requires only to be turned round. (*Mech. Mag.*, Feb. 11. 1843.)

Art. II. *Foreign Notices.*

FRANCE.

Grafting the Vine. — It is now becoming general, in this part of France, to graft the vine in the vineyards. I employ a man for this purpose, who last year grafted 4000 stocks. We have the best of grapes here, which in the ripening season are eaten by every body in immense quantities. I have been in the habit of forwarding contributions to periodical publications during the last fifty years; and, so far back as the year 1790, was a constant writer in the *Annals of Agriculture*, and, even now that age has checked my activity, I employ some hours every day at my writing-table. I have a small but productive garden, in which I take my exercise and watch the cultivation of my vines and roses with great pleasure. Every returning spring seems to bring new pleasures, and I am especially delighted with the bulbous flowers, such as the scillas and the wild tulips, which, with many others cultivated in gardens in England, are indigenous in this neighbourhood. — *E. W. Blois, March* 12. 1843.

Camellias have been raised from seed in the open air in the Botanic Garden at Avranches by M. Bataille, the curator of that establishment. M. Bataille and his friends appear to think that, by being raised in the open air, and allowed to continue there without protection, the species will become acclimatised; but, though the individual plants will doubtless prove hardier than if they had been brought up in a greenhouse, we doubt the possibility of increasing the hardiness of the species. (See *Journal d'Avranches*, May 12. 1843.)

ITALY.

Monza, April 27. 1843. — I have delayed hitherto from sending you the remainder of my critiques on the different articles in your valuable periodical from sheer want of time. His Imperial Highness, my master, seeing that the stoves of these royal gardens were not capable of containing the number of exotic plants which he possessed, and that he could not gratify his ardent desire of enriching his collection with new species, ordered two others to be constructed, each of the length of 18·10 metres, breadth, 6·10 metres, and of the height of 6·65 metres. They are to be heated by Perkins's method. But I have been more particularly occupied in laying out a new botanic garden for perennial exotics only. I have distributed them as you have suggested in your *Hortus Britannicus*, in the Introduction to the Natural System. I divided accordingly the whole area into six compartments, four of which I destined for Exogens, viz. three for the subdivision Dichlamýdeæ, which comprehends the Thalamiflòræ, Calyciflòræ, and Corolliflòræ; the fourth for the subdivision Monochlamýdeæ; the fifth was destined for the Endogens, and the last for the Acrogens. Then I subdivided these compartments into as many spots as there are orders or families which comprehend perennial exotic plants that live in the open air, so that the surface of this garden (unquestionably new for Italy, as all the botanic gardens which I have hitherto seen, and which I know, are geometrically laid out) has the appearance of a geographical map on which the empires, kingdoms, and principalities are laid down.

During the last year the collection of these royal gardens has been much enriched. I shall here transcribe, to avoid prolixity, only those trees and shrubs which stand the open air. *A*‘cer campéstre lævigàtum *A. Brit.*, *A.* c. heterocárpum *Booth*, *A.* c. taúricum *Booth*, *A.* lobàtum *Bosc*, *A.* cólchicum *Hort.*, *A.* col. rùbrum *Booth*, *A.* taúricum *Booth*; *A'*lnus autumnàlis *Lodd.*, *A.* denticulàta *C. A. Meyer*, *A.* subcordàta *C. A. Meyer*, *A.* barbàta *C. A. Meyer*, *A.* oblongàta *W.*; *Bérberis* heterophýlla *Juss.*, *B.* sanguinolénta *Schr.*, *B.* buxifòlia *Lam.*, *B.* hýbrida *Booth*, *B.* mìtis *Schr.*; *Bétula* grándis *Schr.*, *B.* álba póntica *Hort.*, *B.* a. *u*rticæfòlia *Hort.*, *B.* glandulòsa *Lodd.*, *B.* Thouín*ii* Lodd.; *B*úxus sempervìrens caucásica *Booth*; Calóphaca wolgàrica *Fisch.*; *C*aprifòlium prolíferum *Booth*; *C*árpinus *Carpinizza* Hort.; *C*astànea vésca *a*splenifòlia *Hort.*, *C.* v. downtoniàna *Booth*; *C*éltis occidentàlis scabriúscula *W.*; *C*érasus Pseùdo-*C*érasus *Lindl.*, *C.* hyemàlis *Mx.*; *C*lématis nepalénsis *Dec.*, *C.* sibírica *Mill.*, *C.* *s*milacifòlia *Wall.*, *C.* sp. of North India; *C*ratæ‘gus *O*xyac. regìnæ *Hort.*, *C. O.* puntcea *A. Brit.*, *C.* *a*piifòlia mìnor *A. Brit.*, *C.* Douglàs*ii* Lindl., *C.* macracántha *Lodd.*, *C.* purpùrea *Bosc*, *C.* altàica *A. Brit.*; *C*ýtisus triflòrus *Hort.*, *C.* purp. atropurpùreus *Hort.*, *C.* p. incarnàtus màjor *Hort.*, *C.* p. incarnàtus mìnor *Hort.*, *C.* p. ròseus *Hort.*; Deùt*zia* canéscens *Sieb.*, *D.* undulàta *Booth*; *E*læágnus horténsis eryvanénsis *H. Vind.*, E. h. soongárica *H. Vind.*, *E.* *s*alicifòlia *Encyc. of Trees and Shrubs*; *F*ráxinus oxyphýlla taúrica *Booth*; *G*enísta thyrsiflòra *Booth*; *Hédera Hèlix* chrysocárpa *A. Brit.*; *H*ippóphaë *s*alicifòlia *D. Don*; *J*uníperus fláccida *Schlcht.*, *J.* nepalénsis *Hort.*, *J.* commùnis oblónga *A. Brit.*, *J.* c. Smíth*ii* A. Brit., *J.* c. canadénsis *Encyc. of Trees and Shrubs*, *J.* c. nàna *W.*, *J.* c. oblónga péndula *E. of Tr. and Sh.*, *J.* lýcia *L.*, *J.* recúrva *Ham.*, *J.* *S*abìna variegàta *Hort.*, *J.* *S*abìna prostràta *A. Brit.*, *J.* Bedford*iàna* Hort., *J.* squamàta *Don*, *J.* thurífera *L.*; *L*igústrum vulg. angustifòlium *A. Brit.*, *L.* v. fl. [not fr.] lùteo *Booth*; Mahòn*ia* Roýlei Booth, M. sp. of North India; Merténs*ia* lævigàta *H. B. & K.*; Menispérmum dahùricum *Dec.*; *P*hiladélphus coronàrius fl. pl., *P.* mexicànus *Schlcht.*, *P.* tomentòsus *Wall.*, *P.* Gordon*iànus* Lindl.; *P*ópulus balsamífera macrophýlla *Booth*, *P.* balsamífera suavèolens *A. Brit.*, *P.* b. *s*alicifòlia *A. Brit.*, *P.* cándicans bélgica *H. Vind.*, *P.* trémula péndula *A. Brit.*, *P.* trépida *W.* ♂, *P.* trépida ♀; *P*ìnus Coúlteri Doug., *P. Teocòte* Schlcht., *P.* pátula *Schlcht.*, *P.* excélsa *Wall.*, *P.* Pseùdo-*S*tròbus *Lindl.*, *P.* Hartwèg*ii* Lindl., *P.* oöcárpa *Schiede*, *P.* oöcarpöìdes *Benth.*, *P.* Russell*iàna* Lindl., *P.* apulcénsis *Lindl.*, *P.* macrophýlla *Lindl.*, *P.* filifòlia *Lindl.*, *P.* californiàna *Lois.*, *P.* occidentàlis *Swz.*, *P.* Montezùm*æ* Lamb., *P.* leiophýlla *Chamisso*, *P.* pérsica *Hort.*; *A*‘bies Smith*iàna* Lindl.; *P*ícea religiòsa *A. Brit.*; Araucària imbricàta *Pav.*, A. Cunninghàm*ia* Ait.; Paulówn*ia* imperiàlis *Sieb.*; *P*rùnus spinòsa dúlcis *Booth*; *P*ýrus pùbens *Lindl.*, *P.* latifòlia glabràta *Booth*; *P.* heterophýlla *Steud.*; Potentílla glàbra *Booth*; Rhámnus Pallàsii f. et m. *Hort. Brit.*, *R.* spatulæfòlia f. et m., *R.* dahùrica *Pall.*; Quércus castaneifòlia *C. A. Meyer*, *Q.* castaneifòlia caucásica *Booth*, *Q.* mongólica *Fisch.*, *Q.* pannónica *Booth*, *Q.* rùbra taraxacifòlia *Booth*, *Q.* rùbra undulàta *Booth*, *Q.* xalapénsis *H. B.*, *Q.* sp. cochleàta *Booth*; *Ribes* resinòsum *Ph.*, *R.* Menzièsii Ph., *R.* nìgrum fruct. máximo, *R.* rìgens *Mx.*; Rùbus nutkànus *Mocin.*, *R.* hírtus *W. K.*; Rhús copállina leucántha *Jacq.*; Spártium scopàrium fl. plèno; Spiræ'a alpìna *Pall.*, *S.* lanceolàta *Poir.*; Táxus Harringtònia Knight, *T.* baccàta fastigiàta *A. Brit.*; Thùja nepalénsis *Lodd.*, *T.* orientàlis stricta *Hort.*; Tetranthèra geniculàta *Nees*, Tília europæ'a *Hort.* (not L.), *T.* e. grandifòlia corylifòlia *H. Vind.*, *T.* e. begoniæfòlia Booth, *T.* e. dasýstyla *Booth*, *T.* americàna heterophýlla *A. Brit.*, *T.* a. macrophýlla *H. Vind.*; Vaccínium salícinum *Chamisso*, *V.* sibíricum *Hort.*, *V.* uliginòsum *L.*, *V.* elevátum *Banks*, *V.* corymbòsum *L.*, *V.* halleriæfòlium Lodd., *V.* cólchicum *Booth*; U'lmus montàna Heyneàna H. Vind.; Vibúrnum daùricum *Pall.*

By this you will see the love our excellent viceroy has for plants, and for the advancement of his favourite science in the kingdom committed to his care. The catalogue of the plants in these royal gardens is now being printed; as soon as it is finished I will send you a copy that you may have some idea of what we possess.

The Bokhara clover has germinated; when it is tolerably grown, it will be transplanted as your correspondent Taylor did, who was very successful with it. We shall see if it succeeds equally well here, and what comparison it bears with the common clover and with the lucern, with respect to the quantity and quality of the forage.

The cultivation of heart's eases, called *Pensées Anglaises*, because the finest came from your happy country, where horticulture is carried to the highest pitch, is all the fashion here. Although I am not a fashionable man, yet even I am enchanted with so lovely a flower, of which there are some very fine ones. — *Giuseppe Manetti.*

NORTH AMERICA.

Indigenous Trees of North America not yet introduced. — It is very true, as you observe, that in Torrey and Gray's *Flora* a great many trees and shrubs, as well as herbaceous plants, are described, which are not yet introduced into England; and I have sometimes thought of collecting them, and cultivating them for sale. To do this profitably, however, I would require to give it personal attention, which at present I cannot do, having a very extensive business already on hand; and good practical labour cannot be permanently secured here unless at a very extravagant rate. As soon as young men are two or three years in my employ, and save a few hundred dollars, they at once begin in some part of the States on their own account. If they have proved faithful to me, I give them a quantity of stuff, at little or no charge, to begin upon. My nursery foreman and house propagator have each forty dollars a month. — *U. Philadelphia, Feb.* 14. 1843.

State of the Country. — This country is at present under a cloud of disgraceful distress. Bankruptcy, a few years ago, was considered a branded shame upon the individual or corporation; but now honour has gone to the winds, and its place is occupied with roguery and breaches of trust. There have been 1500 failures in this city and county during the past fifteen months; and hundreds of individuals who lived in comparative wealth, whose all was invested in stocks, are now in actual want of food and raiment. The widow and daughters who lived in style are now in a room or garret, sewing for their daily bread. Men who had retired from business with honour, and whose heads were silvered with age, have again begun the world of trade without a penny. Consequently, in all this wreck our business has suffered severely; our losses have been great indeed. In this city there were, in 1842, seven stores, or shops, the occupiers of which lived by selling seeds and plants, five of which have failed. The last bankrupt notice I had was a few days ago, from the old, and considered wealthy, house of M'Mahon and Co.; an event which has been daily expected since last September. I think we have now touched the bottom, and that our star is again on the ascendant. We anticipate, therefore, the dawning of brighter days. I cannot close this without calling your attention to the tact and talent of the gardeners that are required for this world of labour. It grieves me to see many of our profession arrive without a solitary reference as to their abilities and character, which should be from men of public standing in England to some nurseryman of the United States, who then can with confidence recommend such to situations; which, by the by, are "few and far between," but yet, when obtained, are generally worth keeping. It is working, reading, thinking, temperate men we want; and, as we go on the locomotive principle, they must move actively; and independently of these qualities, if they have not a knowledge of trees and plants, they had better not cross the Atlantic. The period of arrival should be in March and April: at any other time it will be difficult for strangers to find employment. It is a fact, that many come as ignorant of the present advanced state of horticulture, as if they had just emanated from the middle of the sixteenth century in a confused dream of the science of British gardening in the present day. — *U. Philadelphia, Feb.* 14. 1843.

The Culture of American Vines in Germany.—You will perhaps be surprised when we tell you that, of the American species and varieties of grape vine, there are not less than 200 sorts deserving cultivation for the table or the wine-press, and that we have this month executed an order for 120 plants, of thirty varieties, for the Margrave of Baden. — *W. R. Prince and Co. Flushing, near New York, Jan.* 30. 1843.

NEW ZEALAND.

The New Zealand Horticultural Society. — I have the pleasure to inform you that the Jardin des Plantes of Paris has last autumn made a large collection of seeds, and sent them to Mr. Ward, New Zealand House, London, to be forwarded to the Horticultural Society at Wellington, New Zealand. I expect that by this time the word Zoological is added to the term Horticultural, and that the Society will print their *Transactions* quarterly, and forward them to England. I have no doubt that the settlements which have been made in this island will, in a few years, be among the most important of English colonies. Nelson appears to be backed by an almost boundless extent of country, admirably adapted for English agriculture and gardening, with a superior climate, and land of inexhaustible fertility. The river Nelson flows through a valley of 10,000 acres of rich alluvial soil. — *E. W. Blois, March* 12. 1843.

The Wellington Horticultural and Botanical Society was formed at Port Nicholson before that settlement was two years old. It is prosperous, and has already been extremely useful. The secretary of the Society, Dr. Featherstone, is in correspondence with Mr. Robertson, the superintendant of the Botanical Gardens, Sydney, who has already contributed a number of plants and cuttings; and with Messrs. Loddiges, who, in a letter to R. Stokes, Esq., treasurer to the Society, published in the *New Zealand Colonist* of Sept. 9, 1842, offer to send out boxes of whatever may be required from England, in exchange for the same boxes returned full of native plants, more especially Coníferæ, Orchídeæ, and Ferns. Of all the countries that we have ever heard of, New Zealand is the one that a person whose delight is in plants should prefer to emigrate to; because, though its native flora is one of the most limited found in territories of equal extent, yet such is the mildness of the climate, that plants from a greater number of different regions may be grown in it, than can be grown, as far as we know, in any other part of the world. Under the protection of glass, with scarcely any artificial heat, we believe the pine-apple, and every other sub-tropical and tropical plant, may be cultivated;

and the mosses of Sweden and Norway may be grown on the mountains. Young gardeners and farmers who can command 100*l.* or 200*l.* cannot, all circumstances considered, emigrate to a better country. There may be better bargains got in Canada, and more money to be made there, but the severe winters are great drawbacks to rural occupation and enjoyment. We are happy to think that one very excellent gardener, Mr. Trotter, late gardener to J. T. Brook, Esq., of Flitwick, Mrs. Trotter, and their two sons and two daughters, sailed for New Zealand on the 15th of the present month, May, 1843. — *Cond.*

Art. III. *Domestic Notices.*

ENGLAND.

The Botanical Section of the Tower Street Mutual Instruction Society hold their meetings one evening weekly, at a quarter past 8 o'clock. The prospectus is before us of twenty-four Lectures on Botany, the subscription for the whole of which is only one shilling. The lecture room is in No. 16. Great Tower Street, and there are several gardeners who attend, though nothing like so many as would do so were they aware of the very moderate charges. Meetings for discussion are held on the evenings of every Monday and Wednesday. The lecturer on Botany is Mr. Robinson, and there are above twelve other gentlemen who lecture on Chemistry, Entomology, Geometry, Drawing, Agriculture, Domestic Economy, and a great variety of other subjects. This Institution was commenced in January 1836, and only requires to be known to obtain the support of the neighbourhood. — *Cond.*

Warping Lands on the Thames. — Some months ago, one of the banks which protect Crayford Level, near Dartford, from the overflowing of high tides gave way, and the river flowed over several acres during sixteen tides, leaving a deposit of nearly an eighth of an inch in thickness of rich sediment every tide. Those lands are now let at a rental of from 20*s.* to 30*s.* per acre per annum, and I have no hesitation in saying that I would engage to make them worth three times that rental within eight or ten years, at a trifling expense. I know lands on the banks of the river Parrott, in Somersetshire, let at four guineas per acre, but the sediment floating up and down that river is not to be compared to the rich manure of the Thames, which takes the wash of London. — *James Easton.* 80. *Blackfriars Road, May* 10. 1843.

Draining.—The Duke of Hamilton has been making considerable improvements in the neighbourhood of Garstang for some years past, not only in draining but in the fences and water courses. All the unsightly fences and water courses have been removed, and new ones made. Some may be seen, I suppose, half a mile long, and the fields made about 17 rods wide, parallel to each other, which gives them a very striking effect when viewed from a distance. Cross fences are also made at proper distances with great judgement, and there is no doubt that a great quantity of land will be brought into cultivation by these improvements which has lain uncultivated for ages. The following is the plan of the fences and water courses. *Fig.* 80. *a* is the water course into which the turf drains run; *b*, the thorns or hedge; the bank is raised a very little above the field when the thorns are planted, as shown in the figure. When the thorns have stood about a year, the angle *c* is sloped down to the thorn, as shown by the dotted line. The reason of the bank being raised at the first

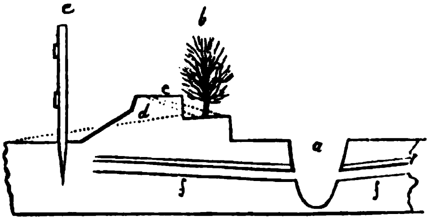

Fig. 80. *Section of the Hedge and Ditch Fences at Garstang.*

higher on one side than the thorn, is to protect it from the wind, and to give heat to the roots from the sun. When the thorns have got completely established, the other part of the bank, as shown by the dotted line *d*, is removed; *e* shows that there are posts fixed, to which rails are attached to protect the thorns from the cattle. On the other side of the fence they are protected by the water course; *f f* show the turf drains leading into the main water course. The Duke of Hamilton being very desirous of getting as much fencing as possible finished and planted every year, planting has been in consequence carried on into the month of May. Much doubt was entertained the first year, whether planting in May would succeed, as the thorns were come into full leaf; but that doubt has been fairly removed, as the thorns planted in May have answered quite as well as those planted in autumn, February, March, and April. — *M. Saul. Garstang, March* 11. 1843. [See *F. Williamson* in *Gard. Chron.*, vol. i. p. 325.]

The Smoke given off from the Chimneys of manufacturing Establishments in the Neighbourhood of the Metropolis has become such a nuisance to the market-gardeners, that they have got up a petition on the subject. The prayer of the petition is, that parliament would pass some legislative enactment by which the nuisance may be abolished, convinced, as the petitioners are, that there are means in existence by which the smoke may be consumed or rendered innoxious, to the great saving of the manufacturer, the advantage of the cultivator, and the general salubrity of the metropolitan atmosphere.—*Cond.*

The Practical and Scientific Association for the Promotion of improved Street Paving. — The objects of this Association are : — To form a museum of all the improved systems for making carriage-ways; to collect and disseminate the most correct information respecting them; to invite the cooperation of men eminent for their practical and scientific experience on this subject; to adopt such measures as will insure justice and impartiality to inventors and patentees; to pursue such a course as will lead to the introduction of that pavement, which, for its general utility and economy, shall not fail to obtain the approbation of the public at large; and, finally, to assist the rate-payers, in any locality, in procuring the introduction of wood, or any better system of pavement, in conformity with the wishes of the majority of the residents. The office is at 20. Vere Street, Oxford Street; and the secretary is J. W. G. Gutch, Esq., author of the *Literary and Scientific Register*, reviewed p. 81.

The Association offers the benefit of organised over individual efforts. it proceeds upon the broad principles of public good, eschewing private interests on the one side, and acting independently of personal opposition on the other. Its province is emphatically to ascertain facts, and to demonstrate truths, not to offer an intemperate antagonism to allowed privileges, nor to stop short of its utmost ability to overcome factious opposition. Pursuing this course, the committee have to submit, That wood paving has so far advanced in practice as to make its general adoption in the leading thoroughfares of the metropolis a highly probable event. The committee found their opinion on the following grounds, viz.: 1st. The comparative quiet produced; 2dly, Its greater cleanliness; 3dly, Its greater durability; 4thly, Its greater facility of traction; 5thly, Its economy in point of expense; and, 6thly, Its greater advantages, in all respects, when compared with granite, paved, or Macadamised streets. But this is not all: the committee are in possession of the most satisfactory proofs, that, in situations where wood paving is adopted, business increases, and the value of house property is enhanced. — *J. W. G. G.*

[We have elsewhere suggested that wood pavement is well adapted for the ground floors of schools and labourers' cottages; and we understand that it is already being adopted even in the floors of kitchens of street houses.]

Tile Draining in Northamptonshire. — The ground can be opened to the depth of 18 in. for the reception of the tiles at 6*d.* per chain; and the soles for the tiles, and the tiles, laid in for 3*d.* per chain. The cost of the tiles is 30*s.* per thousand, and of the soles 20*s.* per thousand; and three tiles and three soles are required for each yard, consequently 66 of each for a chain, at a cost of 5½*d.* per yard in the one case, and 3¾*d.* per yard in the other. Total expense of tile draining per chain in Northamptonshire, 21*s.* Moving soil in the same county costs, for a distance of two chains, 6*d.* per cubic yard, and the price of labour is 9*s.* a week. — *J. M. Northamptonshire, Dec.* 1842.

Leamington Spa, Warwickshire. — In the course of the last winter many trees have been planted along the principal roads, and in many of the open spaces belonging to the town, thus contributing materially to its ornament, and to the production of shade and shelter, and at the same time employing labourers who could not otherwise have got work. The expense was defrayed by subscription, and two of the most active gentlemen on this occasion were Mr. Hitchman and Mr. Cullis.

Gigantic Raspberries. — When I altered Walton Hall, I destroyed the finest garden, for its size, in Yorkshire. But there was no help for it. I was absolutely forced to turn Vandal, and blot it out from the face of the earth. The raspberries in it always grew to the height of 14 ft. Situation caused this growth. I once, in my rambles in Lancashire, fell in with a like situation, and there I found wild raspberries growing fully as high. To obtain this luxuriant growth, the situation must be low and rich; and the raspberry plants must be shielded from the noonday sun by trees, or a high wall. Trees, I should say, would be better. We had always wooden steps on purpose to reach the fruit. My father sent plants of these raspberries to his friends in Yorkshire, and in the county of Nottingham, but they answered not the expectations which had been formed of them. When I destroyed the garden, I saved a sufficient quantity of plants to be cultivated elsewhere. They are still in existence, and their puny growth informs me that I must never more expect to see them in their former luxuriance. When I removed the soil on which they had flourished so surprisingly, I found stony fragments at the bottom, through which there ran a stream of water which got vent from the mouth of a drain at the opposite side of the garden. — *Charles Waterton. Walton Hall, May* 19. 1843.

Victoria Rhubarb produces by far the largest stalks of any of the new varieties, and it is scarcely too much to say that it is equally superior in flavour and suitableness for culinary purposes. In this respect it may be compared to some of the largest Lancashire gooseberries, the flavour of which is not always deteriorated by size. — *Cond.*

SCOTLAND.

The Kirkintilloch and Campsie Horticultural Society has been instituted chiefly for the encouragement of horticulture among cottagers. Prizes are given for the best kept cottage garden in a particular parish or district. The intending competitors give in their names at the beginning of the season, and their gardens are visited, from time to time, by the officers of the Society. Miss Horrocks, a very young lady, who is an enthusiastic member of this Society, has offered a prize for the best essay on the culture of any flower, by amateur cultivators and cottagers; and also for the best canary-bird, goldfinch, and the best three singing birds.

Pine Cones a valuable Fuel. — Dr. Howison, lecturer on botany in Edinburgh, met with the following occurrence in Fifeshire, during one of his botanical excursions. Calling at the cottage of a medical practitioner, a former pupil of his, he found the Esculapius going to mount his pony to visit his patients. Upon the two friends meeting, the practitioner remarked, "Doctor, it is not every day I see you, we must go in and have a *haver.*" Upon entering the parlour there was no fire. He rung the bell; his housekeeper came in carrying in her white apron a quantity of dried pine cones and a lighted candle in her hand. She threw the cones into the polished grate, broke a coal into pieces, and laid them over them. She then applied the candle, when almost instantaneously they broke into a beautiful strong flame, from the great quantity of turpentine they contained. They soon set fire to the coals, and in a few minutes a delightful warm fire was the result. A few blasts of the bellows might be an improvement. Next followed the decanters and glasses; and, it may perhaps be unnecessary to add, the two doctors made themselves comfortable in front of the cone fire. The practitioner obtained this knowledge in the following manner. He was attending a poor woman residing close to the forest. She could not pay him. With the gratitude of the rural population, next morning her two daughters came to his house, each carrying a sack filled with dried pine cones collected in the wood. They told him they were for kindling a fire, and if he had no coals they would make an excellent durable fire of themselves. The cones of the *Pinus silvéstris*, or Scotch fir, contain a great quantity of solid woody matter in addition to the resinous, and are excellently adapted for fuel. They are used over Italy, Switzerland, &c. This circumstance is little known; and the intention of these remarks is to recommend their use to the poor population of Scotland. —*H. Edinburgh. Dec.* 1842.

Remarkable Mountain Ash.—There was cut last week on the estate of Ochtertyre, belonging to Sir William Keith Murray, a mountain ash, or rowan tree, which measured 96 in. in circumference about 7 ft. from the ground, the branches covering an area the diameter of which was upwards of 46 ft. This remarkable tree was upwards of eighty years old; but the wasting hand of time having at last seized upon its aged trunk, the forester was under the painful necessity of cutting it down. (*Caledonian Mercury*, Nov. 26. 1842.)

Art. IV. *Retrospective Criticism.*

Improving Churchyards.—I read your articles in the *Gardener's Magazine* (p. 93. 141. and 215.) with great interest. We may be pretty sure that a disposition to rescue churchyards from their now generally ruinous and disgraceful condition will become more and more prevalent. The self-evident improvement in every way, the force of example, and the progress of taste, in accordance with the attention bestowed on church buildings, will induce people to put these depositories of our forefathers into a more decorous condition. We ought to get rid of the nuisances of cattle in churchyards. Sheep are the only animals permitted by law; but I have seen the law evaded, and cows and horses turned in. Our grasping churchmen will give up nothing, if they can avoid it; and, I dare say, would make a strong fight to retain their right of turning sheep into their *freehold*. However, I am one of those who look upon their property as national property placed in trust; and very bad trustees they make: so that I hope to live to see the nation resume possession of it all; investigate it rigidly, reform the disposal of it, and place it altogether on a different footing.—*H. A. M. May* 3. 1843.

The Volume on Cemeteries. (p. 314.)—I have now read your volume on cemeteries and churchyards, and I sincerely hope you have made a great step towards rescuing us from a barbarism which does not exist among Turks and Chinese, of leaving the depositories of our dead in at once a disgraceful and pestiferous condition. I dare not venture to offer any ideas upon a subject which you have so well considered and explained. It will certainly take hold of the public mind eventually. There is, however, a fashion in these matters, as in most others. No doubt, the Duke of Sussex's interment will give an impetus to the fashion of cemeteries; and I hope ornamental churchyards will follow. There is a difficulty in the latter case. At whose expense can the improvement be effected? Not one out of twenty of our parsons will stir; and, to effect your proposal contained in the note to p. 80. at the end of the volume, we should have to apply a very considerable lever to bishops and archdeacons. The churchwardens, who misspend a good deal of money, and do a variety of jobs in bell-ropes and things of that kind, would run very rusty were any plan of laying out a sixpence upon the churchyard proposed. I am a churchwarden, and, after doing all I can for the decent support and maintenance of the fabric of the church, fight desperate battles with the churchmen in resisting their unwarrantable claims to fees at visitations. I believe these fees are illegal, and cannot be enforced; but I am threatened with all sorts of spiritual punishments, excommunication, and what not, to all of which I am perfectly indifferent. But were the moneys now demanded as visitation fees laid out in improving churchyards, there would be sufficient to keep them in very high order. We want a reform in these matters more than in any other. There are popular prejudices with regard to interments which have to be overcome, and which are generally more durable than any other impressions, as they are founded on religious superstition; just as Sir G. Wilkinson tells us that the incision in mummies was always performed with a *flint*, long after the introduction of *iron* as an instrument, because the system originated before the use of metals. The Cornelian family at Rome kept up the custom of interring the dead entire, long after the practice of cremation. Sylla was the first of his race who ordered his body to be burned. In the same way our peasants, although immensely attached to their churchyards, are averse to alterations, such as planting trees. We had some limes planted in our churchyard many years ago, which, for a time, gave great offence. The grand assemblage of trees in a necropolis of the extent you contemplate would produce a noble effect. Allan Cunningham wished, naturally enough, to repose where daisies grew; and another poet (Moore) describes the wish of the friends of the departed, to

—— " make her a grave where the *sunbeams rest*,
When they promise a glorious morrow."

To a lover of the vegetable world, a desire to repose amid a *forest of various trees* is the most consonant to his pursuits and feelings. Hitherto we have been contented in England with the yew, as the southern nations were with the cypress, which alone Horace permits to follow us to the grave:

——" Neque harum, quas colis, arborum
Te, *præter invisas cupressus*,
Ulla brevem dominum sequetur."

" The cypress only, hated tree,
Of all thy much-loved groves, shall thee
Its short-lived lord attend." FRANCIS's trans.

But enough for the present.—*H. A. M. May* 3. 1843.

Preservation of Fruits.—After what I sent you in my last letter [see p. 186.], I know not what there is of novelty in the method of preserving fruits by M. Loiseleur Deslongchamps so much lauded in the French journals, and announced in the *Mémorial Encyclopédique* for 1838, p. 420., in these terms:— " The Royal Society of Horticulture formerly proposed a prize for the preservation of fruits; the question has been completely resolved by M. Loiseleur Deslongchamps, who has decided that it is necessary to have recourse to artificial cold to retard the maturation of fruits and to render it stationary, and to whom a gold medal has been awarded in consequence at the general meeting of the 3d of June, 1838. His simple and inexpensive method, which consists in keeping the fruit well enclosed and protected from moisture, and at an equal temperature a little above that of melting ice, might have been made a very advantageous speculation for the inventor; but this learned agriculturist preferred giving gratuitously to the public a process which will no doubt become the basis of a new species of industry. M. Loiseleur Deslongchamps had boxes made of zinc 1 ft. high and 6 in. broad, with a detached lid of the same metal with a projecting rim. He wrapped each of his pears in a piece of thin (?) paper (papier Joseph), and over that another cover of common brown paper; the pears being thus enveloped, he placed them in layers in his boxes till they were full. Each box contained, in general, from eighteen to twenty pears, disposed in four or five layers, one above another, and the pears only separated from each other by the thickness of the sheet of paper. The boxes being filled, M. Loiseleur Deslongchamps replaced the lid, sealed it hermetically by pasting thick paper on the rim, placed several of these little zinc boxes in a wooden case, and deposited the whole in an ice-house immediately on the ice."

The wells and cisterns of Marcus Columella have the same effect as the ice-house of M. Loiseleur Deslongchamps; and the closing hermetically, and the impermeability to moisture, are found as well in the vases of Columella as in the zinc boxes of M. Loiseleur: it only remains to be seen if the fruit preserved according to the process of Loiseleur turns speedily sour, like the grapes preserved according to the method of Columella.

All this, and many other things which for brevity's sake I omit, might be communicated to M. W. C. Bosse, who announces: "I intend to make more experiments on preserving plums, particularly by putting them in closely stopped bottles, and immersing them in water." There is no doubt but this attempt will be successful, because an equal temperature and exclusion of air seem to be the principal agents in preserving fruit, and where can both be obtained with greater certainty than in water? (See *Gardener's Magazine*, for 1839, p. 604.) — *Giuseppe Manetti. Monza, April* 27. 1843.

Cato's Method of preserving Grapes.—"The ancients for the most part preserved in vases the sircitulan, venuculan, larger aminian, and Gallic grapes, and those which had the largest berries, hard and loose. Now, in general, the grapes of Numidia are more especially preserved for this use. They are gathered when they are tolerably ripe, in a calm sky, when the sun has dispelled the dew, at the fourth or third hour, in the wane of the moon and after it has set. The stalks are immediately sealed, and they are then put upon a lattice in such a way that one bunch does not touch or rub against another. Having done this, they are brought in doors and the decayed berries are cut off with the scissors; and being somewhat refreshed in the shade, three or four bunches are put in an earthen vessel, and, the lid being put on, they are thoroughly sealed down, so that no moisture may penetrate. After this a mass of grape dregs which have been well pressed are thrown on the top of them, and after having scattered about the stalks a little, and separated the husks, you form a bed of them in the cask, in which these vases are to be distributed with the mouth downwards, and so much space left between them as that the dregs may be heaped up and trodden in. This first bed being made with the dregs well trodden in, in the same manner another is formed with the vases. Afterwards, other strata are formed with the vases in a similar manner in the casks, and in the intervals the dregs are well pressed in. After which the dregs are heaped up to the brim of the cask, which is immediately covered, and the lid fastened down with ashes prepared like cement. We must warn those who buy the vases not to purchase those that are porous or ill burnt, because, in either case, they would admit the damp, which would spoil the grapes. It is also necessary in taking out the vases to remove an entire layer of them, for, when the accumulated husks are once moved, the grapes soon become sour and spoil."—*Idem.*

Garden Walks.—In order that garden walks should not be dusty or muddy, and be easier to free from grass, or rather produce as little as possible of it, it was proposed in your Magazine to use asphalt, a sort of gum (catrame), and pyroligneous acid. (See Vol. for 1839, p. 188, 189. 618. and 619.) Let us see if there is not something analogous in Marcus Porcius Cato. In chap. 92. and 130., we read: "In making a walk, let the earth be finely dug and well saturated with lees of oil, then pulverise it, and level with a roller or mallet. Sprinkle a second time with lees, and leave it to dry. Such a walk will suffer no injury from ants, grass will not grow on it, nor will it be sloppy after showers." Now, what great difference is there, either in the chemical composition or in the effect, between the dregs (morchia) of the ancient Sabine, and the gum (catrame) and asphalt of the moderns?—*Idem.*

Nutritive Properties of Elm Leaves.—In the Number for March of the same year, 1839, p. 125., a notice is given by M. Poiteau of the nutritive properties of the leaves of the elm, as forage for horned cattle. This is also an idea contemporary with Cato the censor. In proof of it, let us look at chap. 30. *De Re Rustica:* " Feed the cows on elm, poplar, oak, and fig leaves, as long as they last." And also in this neighbourhood, perhaps from tradition, but more certainly from experience, the leaves of the elm are so esteemed for fattening horned cattle, that the trees are stripped of their leaves twice a year; and, in fact, there is here no forage nor hay which fattens cattle more quickly than the foliage of the elm. We may presume that these nutritive properties depend on the mucilage contained in the parenchymal tissue, and thence we may conclude that the *U'*lmus fúlva, from what has been said in the *Gardener's Magazine* for April 1840, p. 231., is the most abundant in mucilage, and will furnish, in its twigs and leaves, the most nutritive fodder for cattle.

If in these and many other things modern discoveries coincide with more ancient practices, there are also other subjects in which the ancient practice is entirely discordant to the modern doctrine. • Thus, for example, Cato sowed the seeds of cupressus in soil well manured with sheep or goat dung. In opposition to this, Prof. Lindley, in his excellent *Theory of Horticulture*, p. 354., observes, " coniferous plants can scarcely bear any manure."—*Giuseppe Manetti. Monza, April* 27. 1843.

Yellow Glass suggested for Plant-houses. — A hundred other comparisons could be made, but let the shades of the ancient Romans repose for the present, and let us turn our attention to an argument of the day. From the excellent observations of the celebrated T. A. Knight, the necessity is evident of letting the plants repose or grow torpid, to induce them to produce flowers and fruit in season. Prof. Lindley says that " very low temperature, under the influence of much light, by retarding and diminishing the expenditure of sap of the growth of plants comparatively with its creation, produces nearly similar effects, and causes an early appearance of fruit." This being granted, and the observations of Mr. Horner of Hull and Mr. Hunt, mentioned in *Gard. Mag.*, 1841, p. 629. and 630., being borne in mind, will it not be useful, in furnishing the elaborated matter destined for resting plants, to have the glass of a yellow colour ? — *Idem.*

ART. V. *Queries and Answers.*

LARCH Plantations at Linley.— I propose visiting the extensive larch plantations of the late Mr. More, of Linley in Shropshire, who, I have been informed, first introduced this tree into our country. This gentleman, upon a fortune of about 1000*l*. per annum, clothed a naked country with noble woods, erected a spacious mansion-house, employed a considerable number of labourers in various improvements, travelled over most countries in Europe, collected a valuable library, employed artists in making drawings in natural history, introduced new species of forest trees and exotics, was an independent member of the senate in several parliaments, and left his fortune unencumbered. You will credit me that he was not a man of unnecessary show and parade. (*E. Harries, Esq., of Hanwood,* in Young's *Annals of Agriculture,* vol. xiii. p. 100.)

Can any of our readers oblige us with an account of the present state of the larch plantations at Linley, and of the exotic trees introduced there by Mr. More ? — *Cond.*

ART. VI. *Obituary.*

DIED, on the 4th of April, at Sedbury Park, Yorkshire, *William Sawrey Gilpin, Esq.*, Landscape-Gardener, late of Painesfield, East Sheen, aged 81. (*Times*, April 7. 1843.)

THE

GARDENER'S MAGAZINE,

JULY, 1843.

ORIGINAL COMMUNICATIONS.

ART. I. *Comparative Physiology.* By R. LYMBURN.

(*Continued from* p. 215.)

IN Chap. II. *On Vital Stimuli,* Dr. Carpenter says: — "It has been shown in the last chapter, that the actions of living beings depend on an organised structure possessing vital properties, and certain agents necessary to call the operation of these properties into existence. In the higher classes especially, of living beings, the influence of the *stimuli* supplied by alimentary materials, heat, light, electricity, &c., is directed towards the preparation of a nutrient fluid, which contains the elements of all the solid tissues of the body, and which not only supplies the materials of growth, but stimulates the organs to the performance of their actions. Light, heat, &c., serve as *external* stimuli, and their immediate action is upon the simplest of the organic processes. The nutrient fluid is the chief *internal* stimulus to the nutritive actions of the system, assisted by the continued influence of external agents. The motion of the blood through the lungs is as dependent upon the influence of the air in the cells, as sneezing is upon a stimulant applied to the nostrils; and, if the circulation be suspended, the nerves and muscles lose their power, from the want of the stimulant action of the blood. Both the external and internal stimuli must thus be regarded as vital, as they not only give rise to vital actions, but these actions conduce to the maintenance of life. The action of the internal stimuli will be best considered under the functions of absorption, nutrition, respiration, &c. The dependence of life on the external stimuli, heat, light, electricity, &c., is greater in proportion to the perfection of the structure, and the variety of its organs, and *vice versâ.* Beings of a simple organisation are capable of enduring a deprivation of these stimuli, which would be fatal to those higher in the scale; as the more developed the parts of the system are, the more closely are the parts connected with one another.

"The simpler the condition of any organism, the more susceptible is it of being modified in form and structure by external causes. In the more simple embryonic state also, changes are more easily effected: the germ is hybridised by being furnished with different nutrient matter from another *female* parent than usual; the bee is changed from a working neuter to a queen by peculiarities in the cell and food; and, among the lowest groups of plants, there seems reason to believe that the same germ may assume very different forms, according to the circumstances under which it is developed."

Some have denied the existence of any such thing as stimuli at all, especially as applied to the alimentary materials. It is, they say, the production of the aliment in a proper form, and under the requisite circumstances, that produces activity in the vital functions. When the circulating fluid contains the proper elements, in the requisite condition for absorption, nutrition, &c., these functions will become active, which would cease to be the case, if the necessary changes were not produced by reaction, &c. The presence of nitrogen in the form of ammonia, and alkaline substances, in the young shoots and leaves of plants, producing the well-known dark-green colour so characteristic of vigour, has been thought to produce a stimulating action on the organs, increasing their activity. It has been sometimes known to take place without vigour of growth following; and it may be doubtful whether it denotes the proper state of the food for growth merely, or produces a stimulating action. From the excitability prevalent, however, through all organised tissues, their capability of being stimulated to action has been generally inferred. Müller defines stimulus as a reaction following a disturbing cause, something similar to elasticity, in which a power of attraction causes the disturbed particles to communicate the attempt to displace a portion to the whole, and bring into activity a power of restitution, accompanied by elasticity. The power of reaction or restitution, he says, in organised beings, is, however, more uniform than the elasticity, &c., of inorganic, and arises from that fundamental property resident in them, of counterbalancing disturbances in their composition by a force which, in the healthy state of the body, is much stronger than the disturbing cause. Dutrochet calls excitability a state of susceptibility of excitation. The power of resisting excitation has by others been termed a vital property, antagonist of that of the chemical or exciting, which tends to destroy; and the capability of stimulus would, from the above definition, appear to be a capability of displaying vital actions, or a susceptibility thereto. The quiescent state of the vital principle he terms "a capability of living;" the simplest organised beings retaining this state longest, and seeming least dependent on stimuli. He distinguishes between mechanical stimuli, as pressure, &c., which exhaust, and vital, which renovate. "Nutriment is not merely a stimulus of the organic body; it is itself susceptible of life; it is a stimulus which vivifies, and can itself receive vitality. The constant reanimation of the tissues by the general vital stimuli ordinarily renders them capable of a proportionate exercise of their functions; but, if their action is increased and accelerated, subsequent rest is necessary to restore as much power for new action as has been thus consumed. Rest alone, however, induces weakness; the power of an organ is increased by exercise, not carried too far, and alternating with rest." The affinity of the tissues for the vital stimuli seems to be greater where the developement is less complete, or in the young state. That the power of vitality is increased by its exercise, I have often before noticed; it is from this cause that a lazy slow-growing plant is converted, by cutting in the shoots, into a more vigorous growth; the activity given by the start made after cutting continues. Sets from vigorous-grown potatoes, and cuttings and seeds from vigorous-grown plants, always thrive best. The bad consequences, however, of too much and too long continued excitement in plants, without a due proportion of rest, have been often pointed out, and have been most conspicuous in the forcing of the vine. Much of the bad consequences attributed to excitement are probably also due to a want of balance in the effects of stimuli. Were it possible to follow up the great expansion by heat with a corresponding degree of light, the weakness produced by the former might not be so apparent; and great part of what is ascribed to over-stimulus may be rather due to a deficiency of other stimuli, to a want of light, as well as too much heat.

That the embryo is susceptible of changes at the time of formation, of which it is not susceptible afterwards, is clearly to be seen in the many hybrids produced; and those hybrids being more frequent among plants, shows that the lower grades of beings are more susceptible of these changes. Whether any or what portion of the change is due to stimuli, we are, however, perhaps unable to decide. Whether the germ is produced by the male or female, or the joint influence of both, in seeds, can hardly be said to be decided. There may also be much owing to certain kinds and states of food being required for the developement of parts, without which they cannot be produced. Of this kind seems the transformation from a leaf bud to a flower; the greater degree of elaboration of the sap seeming all that is requisite to produce from a bud, the germ of a branch, so apparently different an organ as a flower. That it is a real transformation seems evident from the many changes observed, from petal to leaf, from stamen to petal, and from a stigma to a branch. The difference however is, perhaps, as much produced from the different quality of the food enabling a different form to be developed and *vice versâ,* as from a stimulus given by the food. The production, or capability of production, of a new being from the bud seems only a lower grade of the function of reproduction, than the more perfect form of it in producing a seed. The changes produced by the different nature of the food in the lowest grades of plants, producing sometimes a lichen, sometimes a conferva, from the same germ, according to the absence or presence of water, seem apparently to countenance the idea of there being something equivocal in their developement, perhaps more than in their generation. The changes produced on higher grades of plants, by the different nature of their food, have frequently been found to alter them so much as to cause them to be reckoned distinct species; yet it has been found that the seedlings from these plants resume the ordinary habit of the species, when again under ordinary circumstances. There may be much of this in the changes of plants so nearly resembling each other as confervæ and lichens; and a fixed character in the germ is more indicative of purpose and wisdom, till the equivocal has been more certainly determined.

On Heat as a Vital Stimulus, he remarks that "all vital action requires a certain amount of caloric for its due performance, and can only continue within a certain range of temperature. The greater the amount and variety of vital action, the more immediate is the dependence of the individual on the maintenance of its usual temperature. Plants are almost entirely dependent on the medium they inhabit for the necessary supply of caloric; and their vital actions are so adjusted as to be carried on within very wide extremes of heat and cold. In the Chinese embassy, a species of Marchántia was found at the Island of Amsterdam, growing in mud hotter than boiling water, at a hot spring; and the beautiful Protocóccus nivàlis, or red snow, reddens extensive tracts in the arctic regions, where the perpetual frost of the surface scarcely yields to the influence of the solar rays at midsummer. The stimulating action of heat is very obvious on plants; it increases evaporation by the leaves, and consequently absorption by the roots, supplying the water which prevents its tissue from being dried up, and, by its conversion into vapour, moderating the temperature, which would otherwise be excessive. If the supply of water is deficient, the tissues get dense and contracted; the shrubs in sandy Eastern deserts assuming a stunted and prickly appearance. Cold depresses vital action, and, if very severe, congeals the juices, and bursts the vessels; the viscidity of the fluids, and the slow conducting power of the wood, tend to resist this injurious effect; and the dormant condition of their functions in winter also tends to preserve the vitality of the system. Heat also injures seeds, probably by a physical change. Grains of corn will germinate after exposure to a cold that would freeze mercury, but their vitality is destroyed by exposure to vapour of 167°, probably from rupturing the vesicles of starch. A curious effect of heat is noticed by Mr. Knight in melon and cucumber plants producing all the flowers staminiferous in excessive heat, and all female or pistilliferous in cold."

On the *Evolution of Heat* in vegetables, Chap. XII., he remarks that "much dispute has occurred, whether plants have a proper heat or not. Although the excretion of carbonic acid is constantly going on, there is also a process of evaporation; the surface is so exposed, and the circulation so slow, that a general maintenance of vital warmth can scarcely be anticipated. In small plants, the temperature is found to vary with that of the atmosphere, and the trunk in large plants to be warmer than the atmosphere in winter, and colder in summer; probably from the slow nature of the transverse conducting power of the wood, and the communication with the deep roots in the soil. Dutrochet has ascertained by recent experiments, that plants do possess the power of generating heat in the parts in which the most active changes are taking place. In the leaves and young shoots he found an increase of temperature of almost one degree, differing with the species, the energy of vegetation, and the time of the day; highest about noon. In germination and flowering, the evolution of heat is most apparent, from the quantity of carbonic acid furnished. In malting of seeds in a heap, the thermometer has been seen to rise to 110°. The flower of a cistus, notwithstanding the conducting power of the atmosphere to carry off the heat as generated, has been found 79° whilst the air was 76°; and that of a geranium 87° when the air was 81°. In the centre of twelve spadixes of the *A'*rum cordifòlium, the heat has been found at 121° while the air was only 66°. Brongniart found the spathe of Colocàsia odòra, at opening, 8·1° above the surrounding air; next day it was 18° above it; and during the three days of the emission of pollen it increased to 20°; after which it diminished with the fading of the flower. Vrolik and Vriese also found the temperature increase when the spadix was placed in oxygen, and no increase at all of temperature to take place when the spadix was placed in nitrogen, nor any carbonic acid evolved."

Heat, light, and electricity are so intimately connected, the one being so generally accompanied with the others, that it is difficult to separate their actions. Vegetation is incomparably most rapid and powerful between the tropics, and there is a far greater preponderance of heat and electricity there than light.

The proportion of light is much greater in the polar regions than the proportional vigour of vegetation there; and heat, generally accompanied by electrical changes, would appear most powerful. Heat appears to act much by its expansive power, as may be seen in the greater elongation between the joints of plants exposed to its influence. It is also indispensable to the chemical and vital powers of plants; but, unless the chemical power is increased by the presence of light in proportion to heat, a weak, elongated, feeble growth is produced. The motion of the air is also necessary to invigorate the growth; and there are probably also other substances got from the air besides carbonic acid, as we shall see when we come to the article secretion. On all these accounts, an influx of air, in a moderate degree, is found beneficial and indispensable in all forcing-houses, when the heat can be kept up during its admission; the vegetation of seeds, and subsequent growth below bell-glasses in heat, are rapid indeed, but proportionally weak. The heat sets in motion the sap, by the evaporation setting the endosmose power to work, and stimulating the excitability and vital properties of the tissue; and heat and moisture, with the nutriment contained in the water itself, and the food it carries in solution, are indispensable to all vital action in plants. The heat also assists the chemical action of the light and of the organs, as we find in wall fruits, in the juicy acid kinds of which there is always more sugar on walls; while, on the other hand, some sweet dry fruits are hurt by the increased chemical action producing more starch, and causing dry mealy fruit on walls, when the same sort on standards would have sweeter and more juicy fruit. Fruit will ripen in heat without light, as in those preserved in warm places, where there is not much light, and mixed among sand, oatmeal, &c., where light is totally excluded. In the bulbs formed below ground, as before noticed, heat also acts independent of light. The heat and electricity of the sunbeam are also useful in increasing the power of the leaf to decompose carbonic acid. Light will not decompose carbonic acid in the same way out of the leaf, as it does by means of the leaf; and the power is therefore to a great degree organic. It is the prevalent opinion that the chemical power of light is the principal agent. Dumas describes it as stored up in the leaf for that purpose: but it may still be doubted, as Schleiden and others seem to suppose, whether the heat and electricity of the sunbeam are not important agents in increasing the action of the leaf, which they think more organical than chemical. Organical action and chemical, heat, light, and electricity, are so intimately connected in their causes and effects, that it is difficult to separate and define.

Heat injures all seeds by drying; though, after considerable exposure to a dry heat, no physical alteration is perceptible on their being magnified. It appears to act principally by drying up the fixed water which all seeds contain, and which seems necessary to keep up the capability of exhibiting vital powers in seeds; all seeds, when bruised in a fresh state, exhibit generally a moist appearance in the albumen, which assumes a dry floury appearance in seeds hurt by dry heat. The vitality probably depends on the capability of exhibiting chemical action, or it may be called electrical following from chemical; and the fixed water, or moist state of the seed, probably is needful in keeping the tissue in a state fit for exhibiting vital chemical properties. When kept from the drying power of air they keep long. Some seeds will stand a great deal of moist heat without being killed, as I noticed before in my essay on the Theory of Horticulture, in adverting to the power of hastening germination in seeds by boiling water: the vesicles of starch are always ruptured in ordinary germination. Heat appears the principal agent in evaporation, the red or heating end of the spectrum, which is always in the positive or plus state of electricity, has most momentum, and will pass most easily through a refracting medium, as glass; and the concentrated rays in curvilinear houses, which are found to destroy plants, probably act more from the evaporation, &c., by heat than from the chemical power of light, to which it has been ascribed; the blue chemical rays do not pass so easily, and are not so likely to be in excess. Heat increases the intensity of light: by throwing heat on the metal of a jet of light, it has been found to cause white light, while, by throwing cold on the metal, it was found to cause a faint blue light. Professor Lardner says it is still uncertain whether heat and light be the same principle manifesting itself in different ways, or distinct physical agents having the same nature. Glass stops more of the heat of the fire than of the sun light, when held between it and an object, and has been thought to distinguish; but this arises, he says, from the heat being so much greater in proportion in the ray from the fire than in that from the sun.

Cold diminishes vital activity, the great source of health and vigour; and diminished vital activity is very apt to end in disease, especially if applied in a previous active state of the vital powers. If the tissue is young and succulent, and full of fluid in the plant, it expands the juices by freezing, and bursts the vessels, causing death of the part affected, and injuring the whole system of the plant before new shoots are evolved. It has been said that the danger is greatest from the excitement produced by next day's heat, and that the air in the air vessels, condensed by cold, and occupying thus less bulk, gives room for the expansion of the cells containing frozen juice; and that it is not till sunrise in the ensuing day, by again expanding the air in the air vessels, destroys this balance, that danger takes place. It might, however, as well be theoretically argued, that the same heat that caused the expansion of the air would again neutralise the danger by thawing the juices. To a certain extent it is true, that covering and watering in the morning will do good; the vegetative organs, weakened by the damage they have sustained, are unable to bear the full stimulus of light and heat, and will not suffer so much when covered. The water, if thrown on before the hoarfrost is thawed, washes it off and restores the temperature of the shoot; it also invigorates and enlivens the healing process of vitality in any of the parts that are sound. After a severe frost in May, the plants are always found to revive much sooner when the frost takes the air, as it is called, and moist weather ensues; those revive soonest that have most spare buds. It is folly, however, to tell the practical man that no danger ensues till the heat of the next day begins to operate: I have myself often watched the plants with anxious heart on such mornings, and uniformly found, that, wherever the leaves had blotches of a darker green, betokening the extravasation of juices from ruptured cells, these leaves were sure to perish. The difference, however, is not perceptible to the ordinary observer, till the heat of the day ensues; and hence the opinion that the danger commences then. Those that do not decidedly exhibit these blotches before the rising of the heat seldom perish altogether, though they sometimes appear whitened in the colour, and scathed in their appearance; and it is to such states of damage that covering and water will be found most beneficial. The continued effect of low degrees of heat, though perhaps not below the freezing point, and not attended with so sudden injury, is also, however, very baneful. When water is in excess in soils, greater evaporation and cooling of the tissue in the young shoots must ensue; and the same will take place in long-continued cold weather. Plants, from being more exposed in their vital parts when growing than animals, are more apt to suffer from cold. So great a degree of heat is not necessary; but that they are possessed of a certain degree of internal heat might be inferred from the chemical and electrical processes going on wherever life is active. The chemical transformations produced in the preparation of the latex should evolve heat. It is a general belief, that most of the food absorbed is reduced to carbonic acid, in order that from the carbonic acid may be eliminated the *nascent* carbon, by the disengagement of oxygen in the leaf; from which, united to the oxygen and hydrogen from water, and the nitrogen from ammonia, are formed most of the products found in the latex or proper juice, especially that azotated matter called vegetable fibrine, from which are formed most of the vegetable tissues. All these processes, united to the vital action of the organs in assimilating the products of the latex and forming the organism, must be productive of a considerable amount of heat, which, though not perceptible in any great degree to a thermometer on the outside, must be of essential consequence where it is generated, and probably indispensable to the activity of life. Whether the heat in these vital actions flows from the action of the vital principle itself, as thought by some, or from the chemical action displayed, or partly from both, it is undoubtedly present, and therefore needed. Whatever states of the weather or soil produce cold must be greatly detrimental to vegetation, and are undoubtedly the causes of many diseases. The cold arrests the proper developement of growth, and produces diseases in the leaves and young shoots, which may be seen in many various forms; and, if long continued, and joined to other injurious circumstances, often ends in producing a cancerous state of the system, and death. That cold is sometimes in a great measure the cause of canker, may be seen in the fact that trees subject to it in ordinary situations are not so when trained to walls. When the tissue is ripened, as in deciduous plants, before winter, and to a certain extent also in evergreens, plants will stand a great degree of cold. Heat is much more easily conducted along than across the woody fibre; and the slow conducting power across, and the comparatively dry condition of the tissues, prevent the danger arising from severe cold in the winter: it is only in the polar regions that it is sometimes so intense as to split the trunks of deciduous trees. Evergreens, from the more fluid nature of the tissues, and the greater degree of vital action, are more easily hurt; and hence, while many of the deciduous plants of America will not ripen sufficiently here, from deficient heat in the summer, and perish during winter, our most common evergreens, which in ordinary seasons are not hurt here, will not stand the greater severity of an American winter. Seeds are seldom or never hurt in the severest winter; the smallest of our seeds will lie on the surface of the ground without injury, as far as cold is concerned, but are considerably and easily injured by the drying power of air, or heat without moisture. Roots of deciduous plants, well ripened, do not appear easily hurt by cold either, as they stand often, when the frost is excessive and long continued, completely insulated in a mass of frozen earth, without the least injury; though they perish, if the roots are long exposed to the drying power of air, much sooner than seeds. A certain degree of moisture around the roots appears necessary to keep the plant alive, and would therefore seem to argue some degree of active vitality in the roots; and perhaps heat and some small portion of moisture are conducted upwards even in winter: it is only in very mild winters, however, that any outward manifestations, by protrusion of spongioles, make their appearance.

The *sources* of the evolution of heat in organised beings have formed the subject of much discussion. When carbonic acid is formed a great condensation of bulk takes place, the carbonic acid not being near so bulky as the oxygen and carbon; and, as the particles of caloric or heat are repellent and expansive, it is said condensation of bulk is always accompanied by heat; and the principal, some say the only, source of heat is in the function of respiration, by which oxygen is inhaled to be converted into carbonic acid in the system. The carbonic acid occupies less bulk than the oxygen and carbon, and the bulk being condensed caloric is developed, from the latent state it becomes sensible. It has been said, however, that the computed effects of the quantity of oxygen inspired are not sufficient to counterbalance the waste of heat in animals, by the various ways in which it is given off by the body; and some say the motions of the body form the source of heat, while others assert that it springs from the nervous system, all the motions of which, they say, are accompanied with electricity, which developes heat. Sir J. Herschel has likened the successive discharges from a galvanic battery, fitted up so as to give off the electricity as it accumulates, to the pulsations of the heart. It has not been shown, however, how motion produces heat unless by condensation; and electrical and chemical processes are so much combined that the one is seldom found without the other. Dr. Carpenter seems to consider the source of heat in animals as still undecided. Professor Müller, in the newly published translation of his works by Dr. Baly, considers the experiments of Brodie, in which artificial respiration was kept up in rabbits after death had been caused by destruction of the nervous system, and in which *carbonic acid was given off as during life without maintaining the heat of the body*, a convincing proof that respiration is not the sole cause of heat. He says (p. 86.): " Several of the facts we have mentioned prove that the influence of the nerves in the organic processes of the body contributes greatly to the production of animal heat in other parts than the lungs. Berzelius is also of this opinion, and it seems to derive confirmation from the rapid and momentary increase of temperature, in states of nervous excitement caused by the passions of the mind." Professor Liebig, in his *Animal Physiology*, which, like the *Agricultural,* abounds in concise and mathematical statements on the most abstruse subjects, seems to consider respiration as sufficient to produce all the heat needed, by furnishing the oxygen which is condensed into carbonic acid by carbon, and into water by hydrogen. The force by which nervous power acts, he says, is chemical; when the nervous power is destroyed, the oxygen inhaled does not meet with these substances with which, in the normal state, it would have combined. He takes no notice of the experiments of Brodie, in which artificial respiration, though the oxygen combined with carbon as usual, and carbonic acid was given off, yet failed to keep up the heat. From the quantity of heat evolved in the combustion of carbon, as experimented on by Despretz, and the quantity of carbon given off from the body, he thinks, by the average of calculations, the heat generated in that way may be perfectly sufficient to replace the waste from perspiration, respiration, &c. Others differ from this. Dr. Carpenter thinks, in plants at least, that the absorption of oxygen, and its subsequent conversion into carbonic acid, form the principal source of heat. It is evident that a certain amount of specific heat must be needed in plants, when life is most active; they cannot be altogether dependent on external heat, though, from their vital parts being more exposed than in animals, it is not so sensible to thermometers. The heat produced by a seed in germination is not perceptible, but, when large heaps are put together, it becomes evident; and, could we keep young shoots together and enable vital activity to proceed, the heat would be more perceptible there also. Dutrochet thought plants possessed of a specific heat, and found it greatest after noon; light he found essential, and, though the heat did not totally cease on the first day of darkness, yet by the third day it had disappeared altogether. Exposure, however, even to simple diffused light, he found to restore the heat in a rapid manner. Some have contended for electricity being a cause of heat in animals; others say the electricity is only the consequence of the heat developed by chemical action. Plants are evidently much affected by electrical states of the atmosphere; and as chemical action developes electricity, so may electricity have a power of increasing vital chemical action, in which heat may be developed. The diffused excitability in plants when put in motion, as it must be by vegetation, may also be a source of heat; it is similar to nervous power, though of an inferior kind, and may produce the same effects in a less degree; they are both also connected with vital power. As nervous force seems to increase heat, as its action is developed, so may the inferior action of diffused excitability do the same by its action in plants, though in an inferior manner. Nervous power may act by chemical affinity to produce the effect wanted, but still be productive of an action which would not have taken place independent of vitality, and be productive of the developement of heat when needed, though done by chemical means. The vital activity of plants, though acting also chemically, may produce the heat required to keep up vital vigour. To these two, therefore, to chemical and vital power, accompanied likely by the developement of electricity, and perhaps often stimulated and set to work by it, are we probably indebted for the specific heat necessary to carry on vegetation.

Chemical action is supposed to commence as soon as the fluid food is absorbed. The quantity of sugar, in the ascending sap, is found to augment, according to the height from the root where it is drawn. This may be, in great measure, taken from the deposits laid up in the albumen the preceding year. Mr. Knight, however, was of opinion that there was a formation of sugar in the ascent of the sap, by the action of the air in the air-vessels. The starch taken up by the ascending sap, and the organised substances in a state of imperfect decomposition, must all be decomposed before they can be assimilated. What can become of them, if not decomposed? they are not fit for assimilation in an organised state, and must be excreted if not appropriated. A great proportion of carbonic acid is probably formed; indeed it is the opinion of some that all these substances, and water and ammonia, are decomposed into their elements, before forming the proper juices of the plant. So much chemical action joined to that of vitality must be productive of a constant supply of heat to carry on vegetative life. Cold is said to act principally on animals by the condensed state of the air increasing the absorption of oxygen, and thus causing the chemical to prevail over the vital force. It must also act very much by paralysing and stopping vital actions. The absorption of oxygen in plants is not so great as in animals, but cold must act very powerfully by paralysing vital action when it is in activity, the vital parts being so much exposed to its influence. In the dormant state it cannot be productive of much harm, but when the tissue is young and active, and stopped in the performance of its functions, it must get into a diseased state, and become less capable of performing vital actions, when heat again supervenes. The accumulation of nutritious matter also, from the inactive power of the organs, must cause fermentation and corruption of the juices themselves; the chemical power of the oxygen, prevailing over the feeble vital powers of the plant, may induce the formation of an acrid corrosive matter, which injures in place of nourishing, and may end in cancer and death.

Heat, light, and electricity are essential, but that they will not be sufficient without a proper supply of moisture, even in deep-rooted plants, we have evidence sufficient in the year past, of 1842, in which neither fruits nor roots ripened well, but were generally unsound, and the tissues not ripened.

On *Light as a Vital Stimulus,* he remarks "that its action as a stimulus has been much overlooked. Its immediate effects upon the animal system are not so manifest as those of heat, but probably not less important. In the vegetable kingdom its mode of operation is less obscure. The operation of light is so closely connected with that of heat, that it is not easy to say what is due to the one and what to the other. There is scarcely a process in the vegetable economy which does not depend on the stimulus of light. The exhalation of vapour from the leaves, and consequent absorption by the roots; the decomposition of the carbonic acid of the air, and the reception into the system of the carbon thus furnished; the formation of nutritious products, and the elaboration of peculiar secretions, are so completely subservient to it, that they languish under a diminution, and usually cease under a continued abstraction, of its agency. The degree of light necessary to plants is very various. Fungi are found in caverns and mines; and Humboldt met with both endogenous and exogenous species presenting a green colour, in the subterranean galleries of the Freyberg mines. Plants grow towards the light: the roots, however, avoid the light; and many of the simpler plants also, as mosses, ferns, &c., which grow on the north and north-west sides of trees and rocks, while the opposite parts are comparatively bare. By throwing the light from below upwards, by a mirror, among seeds placed in moss, and darkening them from other light, M. Schultz found the order of developement reversed, the roots sent upwards and the stem downwards, showing thus the influence of light on the direction of the stem and roots. In germination the influence of light rather retards than hastens vegetation, the tendency of light to decompose and fix carbon being opposed to the chemical action then required."

On the *developement* of light in plants, "it has been asserted that many flowers, as nasturtium, marigold, sunflower, &c., disengage light in warm summer evenings, but it is doubted. There is no doubt, however, that light is emitted by many fungi, especially various species of Rhizomórpha, and, in some instances, to a very considerable extent. The light is perceived in all parts of the plant, but chiefly in the young white shoots; and it is more vivid in young than in old plants. The phosphorescence is stronger in such as grow in the moist and warm localities of mines, than in those inhabiting dry cold situations. It ceases if the atmosphere is deprived of oxygen, and reappears when restored to the air. The juice of the *E*uphórb*ia* phosphòrea emits light, especially when heated. These evolutions of light seem connected with the combination of carbon and oxygen; it takes place also from dead and decaying wood, but is not increased when the substance is placed in pure oxygen. In animals, where it is more common, it appears to be occasioned by the secretion of a product possessing a luminous property, depending for its continuance on the life and health of the animal."

The power of light has been thought to lie principally in its chemical action, though in the sunbeam it is always accompanied with heat and electricity, and it must be difficult to separate the action of each. A white light is always indicative of intense heat, the latter generally producing the former, when raised to a high pitch; they so generally accompany one another, the one always increasing the action of the other, that it is difficult to talk of them separately. Heat and light are like electricity and magnetism, the one producing and reacting on the other. It has been said, light acts chiefly by its chemical power, but the chemical rays are at the faintest end of the spectrum, and possess less momentum than the red; this is said to cause the azure-blue colour of the sky, by their small momentum causing them to be retained, and the red colour of the rising sun by the red rays possessing most momentum, and being first seen. Faint blue light, however, does not produce so much effect on vegetation, which is always greater the whiter and more intense the light. It is likely, therefore, the intense sunbeam containing both light, heat, and electricity, is the best adapted to encourage vigorous growth. Faint light will produce action, as is seen in the action of the moonlight on plants, especially in tropical countries; but white light is most powerful. Light is not indispensable to vegetation, as may be seen in bulbs and tubers produced at roots without the foliage ever having been above ground, if any were produced. Müller says, it is a general rule in organic action, that many various stimulants are capable of exciting the organs to produce their action, and still the action will be produced in the same normal form. It is likely that the heat, light, and electricity of the sunbeam are all concerned in furthering organic action. Plants differ greatly in their power of being affected by light; perhaps from their being too susceptible of stimuli, it is too powerful for some, as the leaves are found to get feeble and flaccid when exposed long to full light and heat. The power of standing much stimulus appears also to depend on the power of absorption; such leaves as those of the camellia would appear not so susceptible of being hurt by stimulus as those of the geranium; yet, from the more vigorous roots of the latter, it is enabled to stand much more light than the former, which thrives better in heat and diffused light. Alpine plants, being naturally much exposed to light, should thrive well in its presence; they are accordingly found to like it in winter: but in summer the heat of the sunbeam is too powerful, and they require shading with all the air possible; the cool air sifted through a hedge appears to suit them well. The green colour has been said to depend on light, but it rather seems to depend on the alkaline state of the chromule, which the deoxidising power of light furthers. In mines where hydrogen abounds, plants are found green though shut out from light; probably through the formation of ammonia from the hydrogen absorbed by the leaf uniting to the nitrogen of the air deprived of its oxygen in the air vessels, and producing thus the alkaline or green colour from the predominance of alkali (ammonia), by a different process from that of deoxidation, which is a diminution of acidity. Dumas describes the power of light as being stored up in the leaf. Light appears capable of being retained in a latent form. The experiments of Mr. Hunt, in producing pictures by pressing substances together, without the aid of light, which is needed in the daguerreotype, have been thought to be effected by latent light. Professor Thomson says, calcined powder of oyster shells, mixed with one fourth part of sulphur, absorbs so much light, that, after being exposed for a few seconds to light, the hours may be seen by it on a watch, when removed to darkness. It loses and recovers the property of giving out light, by exposure to darkness and light. Heat increases the light of this pyrophorus, he says, and diminishes its duration. Large pulpy leaves are most productive of action, perhaps from the greater quantity of organic action chiefly; but part of the power may arise from their greater capability of absorbing light. The organs destined to prepare the food for assimilation probably abound most in the leaf, as the greatest changes on the food are produced there, and they are likely to abound more and be more perfect in strong vigorous pulpy leaves; and the action of the sunbeam on these organs, whether by light or heat, or both combined, will probably be more powerful where there is a greater absorbing power.

On *Electricity as a Vital Stimulus*, he says: "The mode and degree in which this agent operates on the living system is one of the most obscure but most interesting questions in physiology. If, as there is reason to believe, all the new combinations of elementary substances formed in organised bodies are held together by the same affinities as the inorganic world, namely, by electrical attraction, it is evident that electricity must be regarded as one of the most important of all the vital stimuli, since upon its mode of operation will depend all the earlier stages of the nutritive process. The electricity required will probably be generated within the system itself; since the constant variations in the atmosphere would be attended with too much uncertainty of operation, were living beings dependent on the electricity supplied by it. In all meteorological changes of the atmosphere, alterations in the electric state of the atmosphere are largely concerned; and the more decided the change, the more evident is the electric disturbance. Many vegetables close and unfold their flowers on the approach and retreat of a storm. In highly electrical states of the atmosphere, young shoots have been observed to elongate with extraordinary rapidity. This effect, however, cannot be imitated by the artificial application of the stimulus, though a gentle current transmitted through the plant seems to increase exhalation, and affect consequently other vital processes; what is beneficial to some, however, may be injurious to others. In the germination of the seed, the functions are confined to the conversion of starch into sugar, an essentially chemical change, involving the liberation of carbonic and acetic acid. As acids are negative, the seed itself may be regarded in a negatively electric condition; and, accordingly, it is found that the process of germination may be quickened by connecting the seed with the negative pole of a feeble galvanic apparatus, and retarded by a proximity with the positive. In animals, though electricity seems to possess a peculiar relation with the organic processes, especially muscular contractility, yet no very definite influence seems to be produced by its external application to the system. Many tribes of animals appear to be peculiarly affected by changes in the electric condition of the atmosphere, and almost every human being may be cognisant of them from his own feelings. The destruction of life by electricity is accounted for by the disturbance of the affinities between the component elements of the body and the destruction of the vital properties of the tissues, especially the nervous. Bodies killed by lightning pass more rapidly into putrefaction than those killed by other means; the decomposition of flesh already dead may be hastened by electrifying it. The ordinary processes of vegetable growth are attended with the *evolution* of electricity, as proved by the experiments of M. Pouillet, in which seeds had no sooner sprouted and growth commenced, than the gold leaves of the electrometer were separated half an inch from each other. The growth of plants he thinks one of the most constant and powerful sources of atmospheric electricity. Dr. Graves accounts for the violence of meteorological phenomena in tropical islands, by the evaporation from the sea rendering the atmosphere positively electrical with great intensity during the day, at the very time when terrestrial vegetation is rendering the air negatively electrical. Contrary electrical states are produced by the processes of decomposition and recomposition going on in the vegetable juices, and wires placed in the pith, bark, and different places of the plants, and their fruits, denote different states of electricity. Dr. Prout supposes that the small quantities of mineral bodies usually regarded as accidentally present in the vegetable tissues may have an important influence, through electricity, on their properties and actions. The various secretions in animals have been thought to take place from different states of electricity: as acids and gastric juice, in the kidneys and stomach, from positive electricity; and alkali in the bile and saliva, in the liver and salivary glands, from an excess of negative electricity there prevalent."

As I before noticed on heat, the source of heat in animals has been ascribed to electricity by some. Electricity, they say, is the power by which nervous influence acts. The electricity developed in the brain is, they assert, transmitted along the nerves and across the muscles, which contract by the tendency of electricity to attraction, and electricity is always accompanied by heat. Sir J. Herschel, on viewing the voltaic pile of De Luc discharging itself at regular intervals as the tension accumulated, is said to have drawn the inference, that the circulation of the blood in man was owing to electricity collecting in the brain, and discharging itself at regular intervals along the nerves conducting to the heart. Dr. Carpenter, however, seems to doubt if such opinions be tenable; and Liebig says there is no ground for them. At page 261., however, he says: "still, as a current of electricity (or a magnet, which produces a current of the same) acts medicinally, causing motion and change, it cannot be considered inefficient." Müller says: "Neither Person nor he has been able to detect electric currents in the nerves. Pouillet thought the electricity detected by needles was owing to oxidation of the steel; as needles of platina, gold, or silver did not give the same indication. Matteucci has seen a deviation of fifteen to twenty degrees in the needle when the liver and stomach of the rabbit were connected, which might be owing to different states of electricity. In the nerves themselves Matteucci could detect no electric action; but neither was the galvanometer affected when the current of a galvanic battery was passed through the nerves. Bellingeri concluded from experiments, that in inflamed blood electricity is diminished, and that blood retains its electricity long after it has been abstracted from the body; but the real existence of free electricity in the blood generally has yet to be proved. Dutrochet's imagined formation of muscular fibre from the blood, by the agency of electricity, has been shown to be an error. Pouillet, in his experiments on the developement of electricity during vegetation, found that vitreous electricity was detected in the gases formed, while resinous electricity was accumulated in the vessels they were growing in." There seems very great difficulty in arriving at perfect conclusive opinions on this subject; as the chemical transformations of the living body are always attended with disturbances of electricity, so, likely, will a highly electric state of the atmosphere react on the vital functions. In a moist state of the atmosphere, which in that case has a greater conducting power, the body feels more cool and relaxed, probably from its greater negative state; in a dry state of the atmosphere, the body feels oppressed from the accumulation producing a positively electrical state, probably acting injuriously from excess. Some have thought they could detect the presence of galvanic currents in the body, from a magnet being deflected when held near a part of the body. Galvanic currents of electricity are generally thought to pervade all matter, and to be the cause of the magnetism of the earth, and of the formation of metallic veins. The metallic saline substances pervading all plants should attract and increase the conducting power of electric currents, and further the intensity of vital actions: as vital chemical changes develope electricity, so, likely, will currents of electricity react on and increase vital force. Experiments made on the atmosphere near hedges and woods show that it is there in a more negative, or minus, state, from the attractions exerted by the vegetating points; and plants act on the positive state of vapour in the air, and produce thus condensation and rain. Thomas Pine, Esq., (*Polytech. Journal*) found the point of a living plant to draw off electricity from the prime conductor of a machine at the distance of 14 ft., collecting also dew at the point, while the magnetic needle acted only at 4 ft. distance. He found vegetation more powerful when the atmosphere only was electrified, than when electricity was communicated to the soil only. The atmospherical apparatus of Mr. Cross, placed among trees, was found to collect much less electricity, owing to the attraction of plants, than when among houses. Mr. Pollock found that water produced a chemical action affecting the galvanometer, when it was added to a coloured solution, but produced no action upon a transparent solution, seeming merely diluted; a white colour producing reflection, and no absorption or conduction, while dark-coloured absorbing substances absorb light and conduct electricity: in every change of colour, he says, in a solution by heat, there is an action on the galvanometer. The film of iodine on the daguerreotype plate, which at first repels the vapour of mercury, is changed in its electric condition by the action of light, and attracts the vapour; light has thus the power of exciting an electric condition, if not itself combined with electricity. Electrical light is said to produce the same effect on the daguerreotype plate as sun light. Heat, light, and electricity repel and elicit each other; the passage of electricity always produces a change of atoms in the conductor, and frequently produces both heat and light. Heat developes electricity, as seen in high-pressure steam; and heat and light mutually render each other sensible, accompanying each other in all bodies, and the developement of the one being generally followed by the other. It becomes, therefore, a very complicated task to which of these agents to ascribe the phenomena that take place. It has been said that negative electricity, which gives its spark in the form of a pointed star, is concerned in forming the fibrous elongated thread-like vessels, whilst the positive, which gives out its spark in the form of a brush, is concerned in forming cellular vessels; it is probably, however, only conjectural.

The vitality of seeds has been said by some to depend on electricity, but electricity will not rouse the dormant vital power; the capability of exhibiting vital action seems to depend more on their retaining solidity and moisture; as vital action is set to work, it will likely, however, by the chemical action produced, develope electricity. The reason why seeds vegetate soonest at the negative pole is said to be from the alkaline substances collected there being needful in germination. Seeds germinating naturally have been found to throw off acids and accumulate alkalies; and seeds bottled in alkaline solutions have been found to germinate more quickly than natural, while those bottled in solutions of acids have been found to vegetate in a retarded imperfect manner. It is not likely that the functions in germination are confined wholly to the conversion of starch into sugar; though the most obvious change, it will require to be followed up by the preparation of the latex, or life blood, of the plant. Dumas says all the tissues of vegetables commence being formed from an azotated matter called vegetable fibrine, similar in its properties to the fibrine of the blood of animals; it is contained in the grey milky substance first deposited in seeds; and when seeds germinate we again find it in the cotyledons. The substances deposited as food are probably, therefore, at least in part, converted into their elements, from which the latex containing fibrine, mucilage, &c., is formed. The fibrine, the insoluble nitrogenised constituent of seeds, must be again rendered soluble, new fibrine also formed, and the other substances decomposed and recomposed into a state fit for assimilation. The peculiar juices vary much in different plants; it is difficult to get them in a pure state, being generally mixed with the ascending sap in the act of extracting. In the present state of vegetable chemistry, Professor Thomson says, "an accurate detail of their properties cannot be attempted; the cambium, however, which, according to Mirbel, makes its appearance in all those parts of vegetables where new matter is being formed, is entirely mucilaginous." Much chemical decomposition and recomposition is probably required in forming the vital fluid for assimilation.

On the *pressure* of the atmosphere, he notices the effects of violent and sudden changes on animals: "Though it cannot be regarded as a vital stimulus, yet it has an important influence on the functions of life. The whale can dive in the water to the depth of 100 fathoms, at which depth the pressure is twenty times greater than at the surface, and where the sword-fish and its other enemies are unable to follow; the condor, also, can dart from the highest peak of the Andes to the brink of the sea, passing through a barometric pressure of from 12 to 28 inches: but the greater number of air-breathing animals are adapted to reside on the surface of the earth, subjected to the usual pressure of the air. It is probable that man, possessing as he does in so remarkable a degree the power of adaptation to external circumstances, could support life under any degree of rarity of the atmosphere which will maintain that of other vertebrated animals; but the rapid change from the ordinary pressure to one much less in amount is usually accompanied in him, as in other animals, with more or less disturbance of various functions." The deficiency of oxygen in rarefied air, from its want of condensation, causes increased respiration to furnish the requisite quantity, which augments the effects of a want of pressure. He takes no notice of the pressure on plants, but the growth of plants in rarefied air is feeble indeed, when compared with that under the ordinary pressure of the atmosphere. Part is no doubt due to the expansion by heat, and attraction of, and consolidation by, light; but the want of atmospherical pressure, and especially of the motion caused by the pressure of atmospherical currents, tends greatly to draw up plants in a sickly weak condition in confined situations. Plants are never so vigorous as when submitted to the free action of the air, under ordinary circumstances; and plants grown under glass will always be found more vigorous when sufficient heat can be kept up to allow of a free ingress of air. Alpine plants never thrive so well in summer at the foot of a north wall, as at the foot of a north hedge. The removal of injurious heat is indispensable and beneficial, but when accompanied by the sifting of the wind through the hedge is still more beneficial. It is probable, though not hitherto allowed, that the respiration of plants, or their emission of carbonic acid, which is a constant function (as in animals), is due to the removal of waste or unsound particles from the system, to which the motion by atmospherical currents may be necessary. No vessels appropriate to interstitial absorption have yet been discovered in plants; but the discovery of laticiferous vessels is only of late date, and in the young growing shoots, where the removal of unsound particles will be most needed, such vessels will be difficult to detect. There is no muscular system in plants, as in animals, to produce waste in a great degree; they cannot exist, however, without inhaling oxygen, and, though part of the oxygen may be needed in chemical decomposition, to reduce the starch, &c., into food, yet the carbonic acid exhaled is likely to be, as in animals, from waste. It would help to determine this, if, by experiment, exposed plants were found to exhale more carbonic acid than protected plants. It has been shown by the experiments of Burnett (*Journal of the Royal Institution,* n. s. vol. i.; Carpenter, 2d Con. p. 338.), that the evolution of carbonic acid in vegetables is a constant function, even when fixation is most rapid in the full light of the sun. This seems a fact not generally known, as most other physiologists take no notice of it; Liebig says it is not the case. There seems little doubt, however, of its being correct; and the inhalation of oxygen, and exhalation of carbonic acid, would seem to infer a removal of waste.

(*To be continued.*)

ART. II. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the CONDUCTOR.

(*Continued from* p. 301.)

V. DESIGN FOR A CEMETERY OF MODERATE EXTENT, ON LEVEL GROUND, EXEMPLIFIED IN ONE NOW BEING FORMED AT CAMBRIDGE.

WE shall here copy the Report which we made to the Directors, having obtained their permission for that purpose, omitting some details which have

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[*Continuation of note from* p. 300.]

dition of the dead was entirely different, and that there ought to be a consistency in every thing belonging to the various orders of society. The cause of the mistake which the poor make is this: that, by so uncalled for an expense, they think they show their greater respect for the dead, as if a dead father or mother (unless he or she were wrapt up in selfishness) would deprive their children of necessaries or comforts to gratify an imaginary and false pride."— *S. H. N.*

The following case shows that where there is a genuine respect for the feelings and wishes of the dead, it soars high over all the ordinary pomp of funerals. It also shows how very careful persons ought to be on their death-bed, not to utter wishes that may give much pain and inconvenience to their relations. No considerate person would have expressed the wish which led to the following instance of

Extraordinary Resolution and Perseverance. — We have now to record a feat of extraordinary perseverance, so rare indeed, that we much doubt whether its parallel can be found. On the 19th of November last, a person of the name of Thomas Wrassel, aged sixty-three, died at Wisbeach, in the county of Cambridge, and previously to his demise he expressed a wish to his only sister, who resided with him, that his remains should be interred in the churchyard at Clarborough, near Retford, at which place he had formerly lived, and where his mother and some of his family had been interred. With astonishing resolution the sister resolved on fulfilling his last injunctions, and set forth with the remains of her brother in a donkey cart. The distance between Wisbeach and Clarborough is ninety-seven miles. During the journey the coffin, which projected from behind the cart, was covered with a ragged coverlet, upon which the wretched sister sat. At length, after being eleven days on the road, she and the coffin reached Clarborough on the 2d of December, and the body lay as it had travelled in the cart, in an outhouse of one of the village inns until Sunday December 4., when the last rites of the church were performed over it by the Rev. W. R. Sharpe, curate: and, after its long transit, it was committed to its last earthly resting-place. The woman herself was not attired in decent mourning, but readily paid the funeral expenses, and expressed her determination to return to Wisbeach by the conveyance in which she had come, in order to dispose of some little property there, preparatory to residing at Clarborough; so that she may be sure of laying her bones beside his bones, and that the kindred dust of the family may commingle together, until the trump of the archangel shall summon them to meet the Lord in the air. The woman is sixty years of age, and the remains of her brother were only placed in a single coffin, although he had been dead for the long period of fifteen days ere the earth received back its own. (*Nottingham Journal*, as quoted in the *Times*, Dec. 24. 1842.)

already been given in Divisions II. and III. as belonging to the subject of cemeteries generally.

Report on the Design for a Cemetery proposed to be formed at Cambridge: made, by Order of the Directors, by J. C. Loudon.

[Referring to Plans and Sections, Nos. 1. to 15.]

The *Ground* purchased by the Cambridge Cemetery Company was, by the desire of the directors, inspected by us on Nov. 8. 1842. It lies in an open airy situation, in the neighbourhood of the town. The extent is 3¼ acres, and the tenure freehold. The surface is flat, with a gentle inclination to one end, from which there is a tolerably good drainage, by means of a public drain along the margin of the New Huntingdon Road, to the river. The soil is a compact blue clay; its present state is in broad high ridges, which have recently borne corn crops, and the soil is therefore favourable for vegetation to the depth of 8 or 9 inches. The ground is enclosed on three sides by a recently planted thorn hedge, and the fourth, or north, side is open to a field of similar surface and soil.

The *Object* of the Cemetery Company is to form a cemetery chiefly for the middle class of society, the total expense of which, including the purchase of the land, shall not exceed 2000*l.*; that being the sum raised by the Company in 200 shares of 10*l.* each. The sum paid for the land being 400*l.*, there remain 1600*l.* for building and arranging the ground.

The duties of the reporter, therefore, are to show the directors, by plans, specifications, and estimates, how the ground may be arranged, and the necessary buildings erected, for the sum of 1600*l.*; to suggest rules and regulations for the use and management of the cemetery; to point out the duties of the curator; and to offer any other suggestions to the directors that may occur to him.

The *Principles* which have been borne in mind by the reporter, in complying with the desire of the directors, are as follows:

That, to prevent all risk of desecration or indecency, the arrangements be such as that no part of a coffin, or of its contents, can ever be again exposed after interment, and, in particular, that no human bone can ever be disturbed. That, the cemetery being intended for all sects and parties indiscriminately, consecration by any one party would be improper. That a lodge for the curator, and a shed and yard adjoining and connected with it, for his implements, planks, barrows, &c., are essential. That a chapel, for all who may choose to make use of it, is also essential. That the frontage, and a portion of the ground along the Histon Road, be not included in the plan in the first instance, in case the cemetery should not succeed; but that the general plan be so contrived that the frontage may be added afterwards, without deranging the cemetery part of the original design. That, the general outline of the ground being rectilinear, and the surface nearly level, the interior walks, borders, and beds, should be chiefly rectilinear and level also, as well for the sake of harmony of forms and lines, as for economy of space. That, in order to throw the whole into an agreeable shape, and form a reserve ground [E, in the plan *fig.* 81. p. 357.] for soil, bricks, and other materials produced or required in digging graves, building vaults, &c., the walk and hedge at one end should be formed within the outer fence. That, as moisture in a moderate degree contributes to the decomposition of animal matter, while in excess, in a strong clayey soil, it changes muscular fibre into adipocere, and also because there is a prejudice against burying in a very wet soil, it is desirable that the ground be drained; but that, as there is not a sufficient outlet for deep drainage so as to carry off the water from the bottom of brick graves or vaults, it is desirable that the surface of the ground should be so arranged as to carry off as much as possible of the rain water falling on it. That, to contribute to the dryness of the surface, and also because it has been ascertained that the gases from decaying bodies will rise to the surface from a very great depth, no trees (except such as may be hereafter introduced for ornamenting particular graves) should be planted in the interior of the cemetery, but only along the borders of the main walks and of the terrace walk, in order to allow the full effect of the sun and wind to dry the ground, and renew the air. That the trees proposed to be planted should occupy as little space as possible; and, hence, should consist of kinds which have narrow conical shapes like the cypress, a form connected with places of interment by classical and even popular association. That these trees should be all evergreens, as being from their unchangeable aspect more solemn than deciduous trees; and that they should be of dark shades of green, as being more solemn than light shades of that colour. That no flowers, flowering shrubs, or deciduous trees, be planted in the cemetery by the Company, but only in the reserve gardens, for sale to such persons as may wish to plant them over graves. That, in order to combine security and a solemn effect with economy, the surrounding fence be a *holly hedge* rather than a stone or brick wall; but that, for immediate privacy and security, the whole be surrounded with a park paling outside the holly hedge, to be retained there till the hedge has overtopped the paling. That the graves should be so arranged that funerals may be commodiously performed, or any grave visited, without treading on graves already occupied. That no catacombs be constructed above the surface of the ground, because the reporter considers every mode of burial, except in the free soil, as unpleasant in idea; and as more or less dangerous to the living from the effluvia which unavoidably proceeds from the coffins, even when bricked up, as that operation is ordinarily performed; and, finally, because this mode of burial is no security against the disturbance of the coffins at some future time.

Nevertheless, to meet the opinions and wishes of those who still prefer burying in vaults and underground catacombs, ample space should be provided for them, and also for brick graves; while those who desire to plant flowers or flowering shrubs on the graves of their friends should have full permission to do so; or, if the directors should desire to plant flowers and shrubs for the general ornament of the cemetery, some may be planted in beds in the situation where graves are to be made, and of the shape of these graves (see *figs.* 21. to 28., in p. 150. and p. 151.); on the principle that the taste of individuals, and even, to a certain extent, of public bodies, ought to be free.

The *general Arrangement* of the plan, as founded on these principles, is as follows.

The Buildings. — The design, estimate, and working plans of the curator's lodge, the chapel, and the responsibility that the cost of execution shall not exceed the estimate, are committed to E. B. Lamb, Esq., architect, whose estimate amounts to 1000*l.*, leaving 600*l.* for the arrangement of the grounds.

The Grounds. — The proposed general arrangement of the grounds is shown in the plan No. 1. [*fig.* 81.], with the signature of the reporter, and is as follows.

The entire area of 3¼ acres is shown enclosed by a holly hedge, planted on the top of a broad bank of soil. The main entrance is proposed to be made at the west end, opening into the Histon Road; and a secondary entrance will be required from the New Huntingdon Road, at the south-east corner, partly for hearses, but chiefly for carting in and carting out materials.

On each side of the main entrance, a piece of ground, G G, is reserved, with a view to the following objects. As the curator of the cemetery cannot be supposed to have full employment for two or three years after the cemetery is opened, he may rent these two pieces of ground, and cultivate them as gardens, which, if partly devoted to flowers for sale, might, it is thought, prove an attraction to the cemetery; while the cemetery in its turn would form a motive to walk from town to the gardens, and ultimately lead to an attachment to the cemetery as a place of interment. Or, should the cemetery not be so generally adopted by the public as it is hoped it will be, these pieces of ground, being valuable on account of their frontage, may be let off for building on; or, should the cemetery be prosperous, and more room required, the spaces alluded to may be added to it.

The chapel is proposed to be placed in the centre of the ground, as most convenient. The entrance being at the end C, a sufficient area is formed in front of that end to admit of turning a hearse and four horses, which may either return by the main entrance A, or go out by the secondary entrance at D.

A piece of ground is reserved at E for laying down any superfluous earth which may occur in the course of digging the graves, and more especially in forming brick graves, vaults, or catacombs. Here also bricks and other materials used in forming graves, vaults, or catacombs, may be deposited; and, some years hence, when the cemetery is in full demand, either in this piece of ground or near the Huntingdon Road Lodge at W, a shed may be formed, in order that the earth-box (Vol. for 1842, p. 200.), with wheelbarrows, planks, casks of cement, lime, sand, &c., may be kept under cover, and also as a place for a mason or bricklayer to work in. This shed is placed close to the side of the approach road, in order that materials may be the more readily laid down or taken up without the necessity of leading the cart off the road. F is a piece of ground which may be let as a garden to the cottage or lodge at D; and, indeed, till the cemetery is in full operation, the reserve ground E may also, in great part, be let for cultivation for a year or two. It is thought that the cottage at D, and the ground F attached to it, and also the shed W, after the cemetery is once established, might be advantageously let to a statuary mason. The shed W is shown with a chimney in each gable, in case it should afterwards be thought advisable to turn it into a labourer's cottage.

In laying out the interior of the cemetery, the first object was to obtain a carriage-road down the centre; not only for general purposes, such as cartage of materials for building tombs, brick graves, &c., but to allow of the hearse approaching the graves as near as possible.

The next object was to form borders, U U, &c., to the main road from west to east, and to the cross roads from south to north. These borders are 18 ft. wide, planted with trees at regular distances; and they admit of being divided into spaces for letting, as permanent places of interment for families who are willing to pay more than for permanent graves in the interior. Between every two trees there may be one burial-place, rendered ornamental by some description of tomb, monument, or enclosure.

The interior is divided into beds 18 ft. in width, with paths between them 4 ft. in width; and a space 2 ft. in width, and raised about 3 in., is shown in the middle of each bed, on which space all the head-stones are proposed to be placed on a foundation of brickwork or masonry carried up from the bottom of the grave, in order that these head-stones, or whatever description of monument or memorial may be placed at the head of a grave, shall always stand firm and independent of that grave. (See p. 156.) The paths between the beds are connected with a common path of 5 ft. in width, which surrounds the beds, and communicates at intervals with the main or central road; so that a funeral may be performed in any part of the grounds, or a grave in any part of the grounds be visited, without once deviating from these paths, or treading on any graves.

The surface of the ground being naturally flat, and very nearly on a level, there will be no difficulty in carrying off the surface water to the point D, though there is no outlet for deep drains. It therefore becomes necessary to render the surface drainage as perfect as possible, and for this purpose the interior of the compartments is raised in the middle as shown in the cross section No. 6. [not given], in which *a* is a level line, and *b* the line of the ground; in consequence of which the water will drain to each side to the green paths under which tile drains will be formed, as indicated by the dotted blue lines R R, &c. The bottom of these drains will not be more than 18 in. under the surface, and they will be covered entirely with small stones or gravel, for the purpose of more immediately and effectually absorbing the water which falls on the surface of the beds. In order to carry off the water from the main road, and also from the walk on the terrace, small branch drains are to be formed, as indicated in the blue dotted lines in the plan.

Trees are shown planted along the walks at regular distances. Those along the central road are supposed to be chiefly Taurian pines (*Pìnus taúrica*), because that species has a dark and solemn air readily clothes itself with' branches from the ground upwards, and its branches admit of "cutting in" to any extent, so as to form the tree into as narrow a cone as may be desirable. Add to these advantages, that this is one of the most rapid-growing of pines. The trees marked s s, &c., are supposed to be cedars of Lebanon; and the four marked T T, &c., deodar cedars. The trees v v, &c., bordering the terrace walk, are proposed to be Irish yews. The trees round the reserve ground, E and F, are to be either Taurian or black Austrian pines (*P.* austrìaca); the latter a tree that has most of the properties of the Taurian pine, with the advantage of being somewhat cheaper to purchase.

At any future period, should there be a demand for catacombs, a range of these can be substituted for the curvilinear walk at the eastern extremity, by removing the holly hedge, and by forming a handsome arcade there, with vaults behind and underneath, as in the Munich and Kensal Green Cemeteries.

Details. — The following is a summary of the details of the ground plan, No. 1. [*fig.* 81. : owing to the

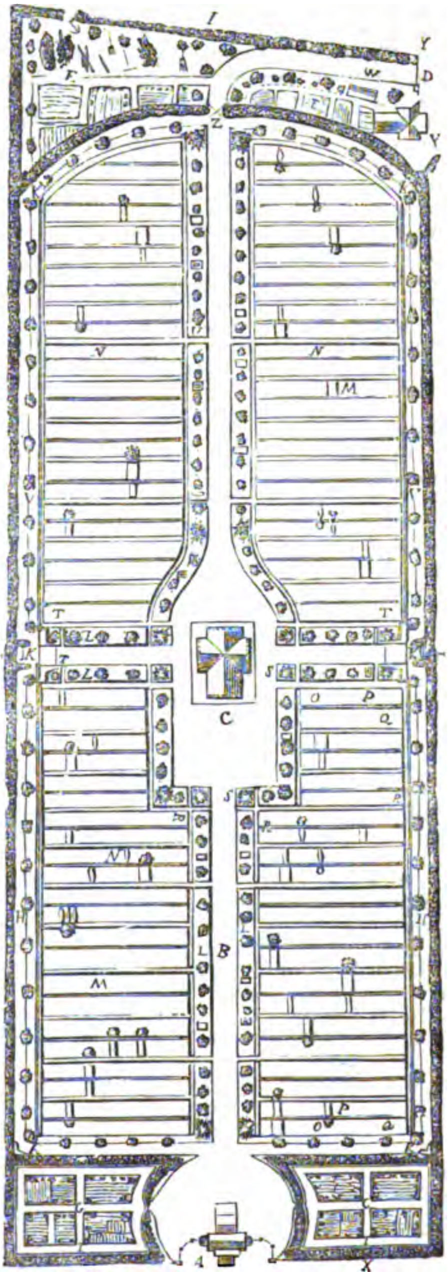


Fig. 81. *Ground Plan of the Cambridge Cemetery.*

reduced scale of this plan, several of the letters of reference have been of necessity omitted.]

A, Principal entrance lodge and gates, opening into the Histon Road.

B, Carriage road.

C, Chapel, standing on a platform ascended by a flight of steps.

D, Entrance from the New Huntingdon Road.

E, Reserve ground for spare earth, for bricks, stones, mortar, and various articles required in digging graves, building brick graves, vaults, &c.

F, Garden to the New Huntingdon Road Lodge. This lodge not being essential, no plan or estimate of it is given. It is thought that it might let sufficiently well as a cottage, to render it worth building on that account.

G G, Reserve ground fronting the Histon Road, which may be used as garden ground, added to the cemetery, or let for building on, as may ultimately be found most desirable.

H H, &c., Terrace walk surrounding the cemetery, and 3 ft. above the general level.

I I, &c., Holly hedges, forming the outer boundary, and also the separation fences between the cemetery and the reserve grounds.

K K, &c., Seats or benches, for the use of persons walking round the cemetery.

L L, &c., Borders for graves with monuments, or otherwise rendered ornamental.

M M, &c., Beds where the graves may either be plain or turf graves, or graves with head-stones, or may be rendered otherwise ornamental at pleasure.

N N, &c., Space along the centre of these beds, on which alone head-stones are to be placed on foundations of brickwork or masonry. Brick graves or catacombs may have the monuments, ledger-stones, or whatever is used as a covering or finish, resting on their side and end walls.

O O, &c., Single grass graves.

P P, &c., Brick graves occupying exactly the space of two single ones.

Q Q, &c., Vaults descended to by stairs, and occupying exactly the space of four single graves.

R R, &c., Tile drains for carrying off surface water, all terminating in the public drain in the New Huntingdon Road.

S S, &c., Cedars of Lebanon.

T T, &c., Deodar cedars.

U U, &c., Lines of Taurian pines.

V V, &c., Lines of Irish yews.

W, Workshed for masons, and repository for planks, wheelbarrows, earth-box, &c., not to be built till after the cemetery is in full operation.

X X, Histon Road.

Y Y, Public drain along the New Huntingdon Road.

Z, Archway to be formed in the holly hedge as it grows; or, if the funds permit, an architectural archway may be here formed at the time the hedge is planted.

No. 2. [omitted] is an elevation of that side of the cemetery which lies along the Histon Road.

No. 3. [omitted] is a cross section on the line CC DD, showing a rise of one foot in the centre of the compartment at *a*, in order to throw the water to the sides at *b b*.

No. 4. [omitted] is a longitudinal section on the line AA BB.

No. 5. [omitted]. Elevation of the south side of the cemetery fence, including the entrance from the New Huntingdon Road.

No. 6. [omitted] is a section across the lodge and the chapel, in the direction of A B C Z.

No. 7. [omitted] is a section along the middle road, to show the fall of the ground from west to east, and the consequent power of surface drainage.

No. 8. [omitted]. A similar section to No. 6., but on a scale four times larger.

No. 9. Section across the terrace on the line II KK, to the same scale as Nos. 7. and 8.

No. 10. [*fig.* 82.] Section across the terrace on the line E E F F, in which *a* is the gravel walk; *b*, the grass walk, 5 ft. wide; *c*, the raised space for the head-stones between the two rows of graves; and *d*, the grass walks between the double beds of graves.

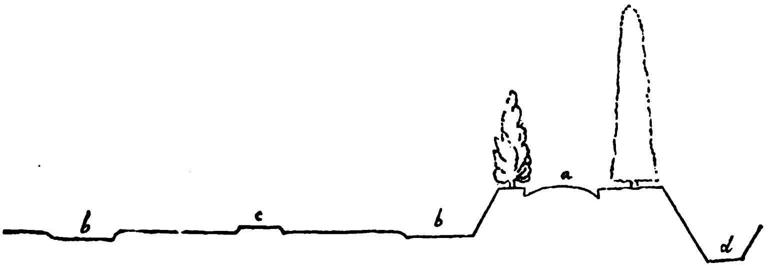


Fig. 82. *Section across the Terrace, and one of the Double Beds for Graves.*

No. 11. [*fig.* 83.] Section across the hedge and bank forming the boundary along the Histon Road, on the line G G H H.

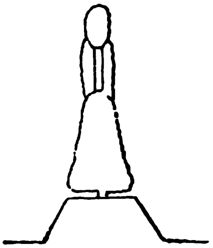


Fig. 83. *Section across the Hedge and Bank forming the Boundary along the Histon Road.*

No. 12. [*fig.* 35. in p. 158.] A plan showing a vault, a brick grave, a common grave, and the mode of numbering the graves.

No. 13. [*fig.* 30. in p. 154.] Section through a brick or stone vault and a common grave.

No. 14. [*fig.* 31. in p. 155.] Section through a brick or stone grave and a common grave.

No. 15. [*fig.* 88. in p. 361.] Isometrical view of the whole. [Though this view is on a very small scale, it is sufficient to indicate the style of the buildings, and the character of the trees: the two gardens in front are also shown, the reserve ground partly turned into a garden, the Huntingdon entrance lodge, and the mason's shed.]

Designs for the main entrance lodge and chapel were given in by Mr. Lamb, both in the Gothic and Italian styles. The directors chose those in the former style, as will appear from a glance at the isometrical view; but, as the designs in the Italian style have great merit, we have had them engraved, partly on this account, and partly because the elevations suit the same plans as those which have been adopted.

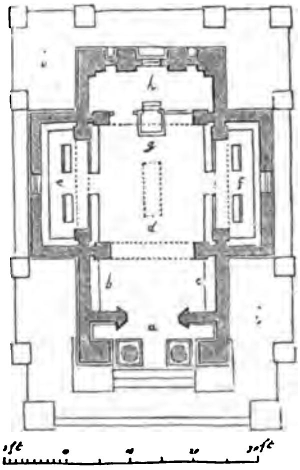


Fig. 84. *Ground Plan of the Chapel.*

Fig. 84. is a ground plan of the chapel, in which *a* is the porch; *b*, four sittings; *c*, four sittings; *d*, coffin; *e*, twenty-four sittings; *f*, twenty-four sittings; *g*, pulpit; *h*, registry; *i*, terrace.

Fig. 85. Elevation of the main entrance lodge and gates. The ground plan contains a porch, a room to be used as an office, living-room, kitchen, and back-kitchen, open court, and shed for implements, &c. The floor above contains three bed-rooms and closets.

Fig. 86. is a perspective view of the elevation, and *fig.* 87. a longitudinal section. [As stone is remarkably abundant at Cambridge, and very easily worked, Mr. Lamb has designed all the buildings with a view to

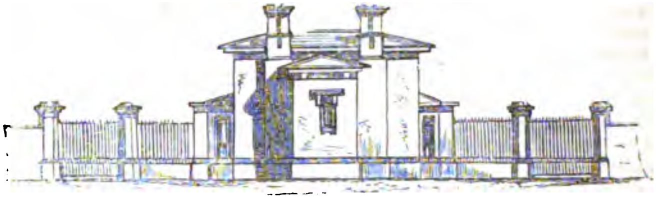


Fig. 85. *Entrance Lodge in the Italian Style, designed for the Cambridge Cemetery.*

their being executed in that material. The coins are of hewn stone; the columns of stone hewn and rubbed; and the body of the walls of rubble, as indicated in *fig.* 86. The roof, in the Gothic designs, is steep, and will be covered by a peculiar description of ornamental flat tile, of which a figure

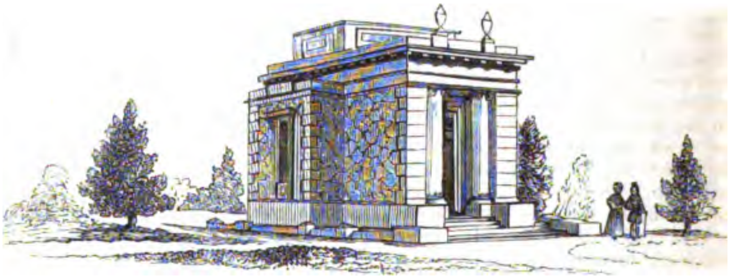


Fig. 86. *Chapel in the Italian Style, designed for the Cambridge Cemetery.*

will be hereafter given. In the Italian design, the roof is flat, to admit of being covered with tiles, bedded either in Roman cement, or in the new cement of Mr. Austin; or covered with asphalte. The platform on which the building stands will be surrounded by a kerb-stone, and the interior laid with asphalte.]

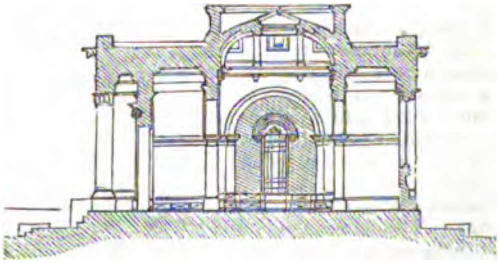


Fig. 87. *Longitudinal Section of the Chapel designed for the Cambridge Cemetery.*

Capacity of the Cemetery and the probable annual Expenses and Returns. — The number of spaces for graves in the double beds, each grave occupying a space of 8 ft. by 3 ft., exceeds 900; and the number of border graves exceeds 200. Under the surrounding terrace 200 more graves may be obtained, and from 800 to 1000 under the front reserved gardens, and the roads, walks, and paths; but, as it is not proposed to open the ground under the terrace, or in the reserved gardens, till the beds and borders are nearly full, nor to bury in the paths and roads, till the cemetery is about to be closed as such for ever, we shall take the number of spaces for graves immediately available as 1200. In order that these may return a suitable interest for the money expended, it is evident that more than one interment must be made in each grave, whether the grave be a private or family grave, or a common grave. Every common grave we shall suppose to be 24 ft. deep, which will give four interments, allowing 6 ft of soil over each. The family graves may either be made in the free soil, or they may be brick graves or vaults, and they may be made of any depth the proprietors may choose. The family graves made in the free soil we shall suppose to be of the same depth and capacity as the common graves; and the brick graves may either be of the same depth and capacity, or, by embedding the coffins in cement, or hermetically sealing each with a flag-stone, the capacity of each grave may be at least doubled.

Hence the 1200 graves may give at least 4800, or say 5000, interments; but, as the space allowed for each grave along the borders is more than double that allowed in the interior beds, 1000 interments at least may be added. Whether or not 5000 or 6000 interments will afford a sufficient return for the capital expended, and the necessary annual expense, will depend on the sum charged for each interment, and the number of interments made in a year.

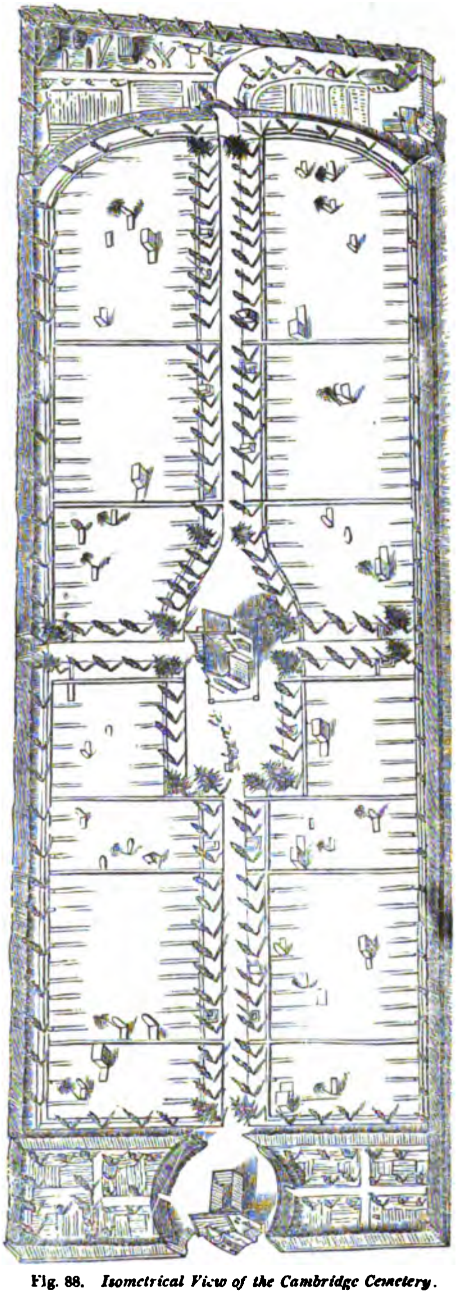


Fig. 88. *Isometrical View of the Cambridge Cemetery.*

	£	s.	d.
The Interest of the Money expended, allowing 1 per cent as a sinking fund to return the principal, we shall estimate at -	120	0	0
Salary of the Curator, and Annual Expenses chargeable to the Cemetery - - - - - - -	180	0	0
Sum which the Cemetery ought to produce annually	£300	0	0

In order to show how this sum may be produced, we shall suppose that there are 200 interments made in a year, and that the sum charged for a single interment in a common grave is 1*l.* 10*s.* which is only 5*s.* per interment more than is charged in the Tower Hamlets Cemetery, where from twelve to fifteen bodies are placed in one grave; and this will give the sum required.

Taking the number of interments which will be afforded by the 1200 available graves at 6000, that number, at the rate of 200 interments in a year, will be exhausted in thirty years. The remainder of the ground will afford at least an equal number of interments, which might extend the use of the cemetery to sixty years.

To supply 200 deaths per annum, reckoning the deaths at 2 per cent of the living, a population of 20,000 is required, or about four fifths of the entire population of Cambridge.

As therefore it would be unreasonable to suppose that so large a proportion of the people of Cambridge would bury in one cemetery, we are forced to the conclusion, either that the price for each interment must be increased, or that the shareholders must be content with less interest than 6 per cent. Suppose we make the calculation at 3 per cent, that will reduce the annual charges to 240*l.*, which will require only 160 interments at 30*s.* or 120 at 40*s.*

Whatever sum is fixed on as the regular price of an interment in a common grave will give the amount of the fee-simple of that grave; and thus, according to the calculation which we have made of six interments to a grave, the price of a family grave ought to be at least 6*l.*; except in the borders, where, from being a place of distinction, it ought to be higher. This price is exclusive of every other expense, and also of a fee which will require to be paid every time an interment takes place.

The price to be charged for a single interment in a common grave should be fixed on partly from the market price for such interments in the best part of the churchyards of Cambridge, but chiefly from the great superiority of the principle on which the cemetery is founded, viz. that no coffin, nor any part of its contents, when once interred, can ever by any possibility, humanly speaking, be again exposed to view.

If, on calculating on the capacity of this cemetery, we were to proceed on the supposition that the common graves might be opened for reinterments at the end of fourteen years, the result would be very different. But on opening at the end of fourteen years, or at any period whatever, it would be impossible to avoid exposing an immense number of human bones, which constitute one of the great nuisances in our present crowded churchyards.

The Mode of conducting the Cemetery is supposed to be as follows.

The choice of a situation for a grave may be made in any part of the beds in the interior, or of the borders along the main walks; but, till the cemetery is nearly full, it is not desirable that graves or vaults should be made under the surrounding terrace walk. When they are made there, the 5-feet grass path which separates the terrace from the beds may have one foot in width added to it from the terrace, and may be laid with gravel from the terrace walk, which may be covered with grass taken from the 5-feet walk referred to. The use of the terrace being thus changed from a walk to a platform for graves, it will of course no longer be walked upon.

As none of the coffins will ever be disturbed by the reopening of the graves, as in common burying-grounds, there is no objection to the use of leaden, zinc, or iron coffins.

The interments may be classed as those made in common or public earth graves, in private earth graves, in brick graves, in vaults having catacombs, and in border graves.

Every grave in the cemetery is supposed to be numbered, and this may be effected in the following manner.

1. *The Borders* may be considered as divided into spaces by the trees, and these spaces may be numbered in regular series, beginning with the right-hand border on entering the cemetery from the main lodge, and terminating with the last space on the left-hand border. A number-stone may be put in in every tenth or twentieth bed or space.

2. *The Beds in the Interior.* Beginning at one end (say with the first bed on the right hand on entering by the principal lodge), a stone with a smooth end, 6 or 8 inches by 2 ft., and at least 2 ft. in depth, is to be inserted in the ground at each end of the middle space of the beds, as at *a* and *b* in the plan No. 13. [*fig.* 35. in p. 158.]. On the stone *a* is to be cut the first number of the bed, I.; and the last number, viz. L.: and on the stone *b* the last number of the one side, XXV., or one half of the graves in the bed; and the commencing number of the second side, XXVI. Thus, in every double bed throughout the cemetery, the stone at the north end will exhibit the number of the first and the last grave on that bed, and the stone at the opposite end the number of the last grave on one side, and of the first grave on the other. Should any two adjoining spaces adapted for earth graves be occupied as a brick grave, or any four spaces be required as a vault, in these cases the brick grave would be entered in the cemetery books under the head of two numbers, and the vault under the head of four numbers.

It is not necessary to begin by putting number-stones to all the beds; but when choice is made of a bed at a distance from one that has already been numbered, a calculation must be made of the numbers that would occupy the intervening beds, and the two number-stones placed accordingly at the ends of the bed in which the interment is to be made.

Every brick grave or vault must, therefore, necessarily be a multiple of a common grave, otherwise the numeration will be deranged.

When a bed is to be spoken of as a whole, it can be designated by the first or lowest number in the bed. Thus, supposing the beds to contain fifty graves each, we should have beds No. 1, 51, 101, 151, 201, and so on: or, in addition to the numbers, a letter may be placed on each stone, and we should, therefore, have beds A, B, C, &c.; and, after a single alphabet was exhausted, AA, BB, &c.

3. The *Graves or Vaults under the Terrace* will require to be similarly recorded to the border graves, a number being allowed for every space between the trees; or two numbers, if that should be thought necessary.

4. When the *Reserve Spaces*, G G [in *fig.* 81.], are added to the cemetery, the separation hedge will be removed; and the border, terrace, and beds extended; and, hence, the graves there will be recorded according to the modes already mentioned.

The *Earth Graves*, or graves of the simplest kind, are to be made within a space 8 ft. by 3 ft.; which, allowing a margin of 3 in. at the sides, and 1 ft. at the end next the 4-feet path, will give 7 ft. by 2 ft. 6 in., which is 6 in. longer than is allowed in the Kensal Green Cemetery, besides allowing a space of 1 ft. by 3 ft. for a foot-stone or number, if the purchaser of the grave should think either of these necessary. For a single interment it must be dug at least 6 ft. in depth; but, if it is intended to make two or more interments in it, it must be dug 6 ft. deeper for each additional interment; and, as the limit to depth need not be settled, any number of interments may be made in a common grave that the proprietors of the cemetery may fix on, or in a family grave that its owner may determine.

In order that the sides of the earth graves may remain firm, and not be pressed in by the loose earth of an adjoining grave, they should chiefly be formed alternately with firm ground which has not been buried in, or moved within six or seven years, or next to brick graves or vaults; but, should it become necessary to open one grave adjoining another which has been recently made or opened, recourse can always be had to planks or grave-boards [*figs.* 37. and 38.]; which, indeed, may be considered absolutely necessary as safeguards in the case of all graves dug above 6 ft. deep adjoining ground which has been moved.

Every reopening of a family grave for another interment should be charged according to the depth when it is an earth grave; say for a depth of 6 ft. 3*s*., 12 ft. 6*s*., and so on; and, when it is a brick grave or vault, according to the expense of removing the ledger or covering stone, &c.

To insure the keeping of gravestones, monuments, and flowers planted over graves in order, the fee-simple of the estimated annual expense of doing so should be paid down by the proprietor of the grave, at the time of putting up the monument, or putting in the plants [on the principle laid down in p. 218.].

Brick Graves. These require to have side walls of from 9 in. to 18 in. in width, according to their depth; and these walls should be curved, so as to resist the lateral pressure of the soil, as shown in plan No. 11. [*fig.* 35. in p. 158.]. Brick graves, when of great depth, require to occupy the space of two earth graves, and hence the charges for them ought to be double that for earth graves, exclusive of the expense of building; but when two brick graves are built close together, each need not occupy more than an earth grave, because the party wall will save 14 in. in width, thus:—

	ft.	in.
Width of space allowed for two graves	8	0
Deduct three walls, each 14 in. thick	3	6
Leaving a clear space of 2 ft. 3 in. in width for each grave	4	6
Length of the ground, including half the width of the space on which the gravestones are to be placed	9	0
Deduct two 14-inch walls	2	4
Leaving the clear length of the grave	6	8

The ordinary dimensions of the coffins which are always kept ready made by undertakers are 6 ft. long by 20 in. wide, and 16 in. deep; the largest size is 7 ft. by 2 ft. 4 in., but coffins of this size are very seldom required.

If the walls were built in cement, then 9 in. in thickness would in many cases be sufficient; and this would add 10 in. to the length and 10 in. to the width of the clear space, leaving it 7 ft. 6 in. by 3 ft. 1 in.; which would afford ample room for any coffin whatever.

The ordinary mode of burying in brick graves is to let down the coffins one over another, without covering them with earth, but merely laying a flat stone or ledger over the mouth of the grave a few inches above the level of the ground's surface. In some cases a flag-stone, resting on ledges projecting from the side walls of the grave, is placed over each coffin as it is deposited; and when each flag-stone is securely cemented, so as effectually to prevent the escape of gas [see p. 216.], a greater number of interments may be made in one grave by this mode than by any other, and at the same time with perfect safety to the living.

The *Vaults* may be constructed in the usual manner, as shown in the general plan, No. 1. [*fig.* 81. in p. 357.] at q q, and in the enlarged plan No. 12. [*fig.* 35. in p. 158.], and section No. 13. [*fig.* 30. in p. 154.]. A vault of 12 ft. in depth, and 2 coffins in width, will contain 12 coffins.

The Books required for conducting this Cemetery are chiefly: 1. An order book; 2. A register or record of interments; and 3. A ledger of graves, an account being opened for each grave, as in the Kensal Green Cemetery. The other books required do not differ from those in common use. Forms of the order-book, register, and ledger will readily be obtained by applying to any of the London Cemetery Companies, or their stationers. [The essential forms, and the names of the stationers, have been given in p. 221, 222.]

Specification of Work to be done on the Ground, including the Formation of the Roads, Walks, Drains, &c.

Form the surrounding terrace and hedge banks, agreeably to sections Nos. 8, 9, 10, and 11., of the best of the surface soil in the interior of the enclosure; the slopes to be built with a grassy surface, which will be obtained from the most grassy parts of the surface soil; and the whole to be rendered solid and compact, by ramming with cast-iron rammers as the soil is laid down. Form the walk on the surface agreeably to the sections.

Level and smooth the ground on each side of the terrace walk, in order to be sown afterwards with grass seeds, with the exception of a space 2 ft. in width, on which the holly hedge is to be planted. Plant the hollies in April at 1 ft. apart, and mulch them with littery stable dung.

Form the hedge banks as shown in the section No. 11., the sides to be of grassy sods, and the whole firmly rammed; the upper surface being left quite level, smooth, and clear of grass and weeds, for the space of 2 ft. in width along the centre, on which is to be planted the holly hedge. Insert the plants at a foot apart, as above directed.

In depositing the soil both in the terrace banks and the hedge banks, the greatest care must be taken to place nothing but good soil under the line on which the holly hedges are to be planted, in order by that good soil to promote their growth as much as possible.

Surround the whole of the outer holly hedge with a park paling 6 ft. high.

The terrace and banks being completed, level the whole of the interior surface, so as to have one general slope from the point A in section No 7. to the point D in plan No. 1., the fall being supposed to be about 2 ft., as shown in the section.

Form, at the same time, that part of the surface which is laid out in beds, as shown in plan No. 1. [*fig.* 88. in p. 361.], raised in the middle, and sloping towards the sides, as shown in the enlarged section No. 8.

Form the carriage-road of broken stones below, and gravel above, raised 3 in. higher at the centre than at the sides, as shown in the section.

Form the borders to the main roads with a concealed brick edging next the walk, as shown in section at No. 8. *b b* [see *figs.* 56. and 57. in p. 217.], and place a mass of good soil where each tree is to be planted, raised in the centre 1 ft. above the general level, and forming a flattened cone 6 ft. in diameter. As temporary plants, and for immediate effect, introduce one spruce fir 6 or 8 feet high, if such plants can be got, between every two pines, and between every two Irish yews; the intention being that these spruce firs shall be removed as soon as the pines and yews attain the height of 6 ft.

Form the interior into beds 18 ft. wide, with a space 2 ft. wide, and 3 in. higher than the rest of the surface, along the centre of each bed; and form alleys between them 4 ft. in width, and a surrounding path 5 ft. wide, as shown in sections Nos. 8, 9, and 10.

Form the tile drains and the branch drains, as shown by the blue dotted lines in plan No. 1., and also in the sections Nos. 8. and 9., at *c c*.

Plant the pines, cedars, and yews, as shown in the plan No. 1., taking the greatest care to place nothing but good soil under and over the roots, and to unwind and stretch out the roots of all those that have grown in pots. Protect the cedars with circular constructions of wickerwork, and mulch the surface round all the trees, and along both sides of the hedge, with littery stable dung.

Sow the whole of the surface shown green in the plan No. 1. with perennial rye-grass and white clover, at the rate of 1 bushel of rye-grass, and 1 lb, of white clover to the acre.

Estimate of Expense.

		£	s.	d.
2400	cubic yards of Terrace-bank, at 6*d*.	60	0	0
300	cubic yards of Hedge-bank, at 6*d*.	7	10	0
480	lineal yards of Terrace-walk, 6 ft. wide, at 1*s*.	24	0	0
1761	square yards of Road, at 6*d*.	44	0	6
1813	feet of Park Paling, at 2*s*.	181	6	0
16,300	square yards of Surface, to be levelled and formed into Beds and Borders, at 2*d*.	135	16	8
2900	feet of Tile-drain, at 6*d*. per foot, including sink-stones or gratings, where necessary	72	10	0
2120	Hollies, at 10*s*. per hundred	10	12	0
94	*P*ìnus taúrica, in pots, at 1*s*. each	4	14	0
20	*P*ìnus austrìaca, in pots, 1*s*. each	1	0	0
14	Cedars of Lebanon, in pots, 2*s*. 6*d*. each	1	15	0
4	Deodar cedars, in pots, 5*s*. each	1	0	0
76	Irish yews, at 1*s*. 6*d*. each	5	14	0
200	Spruce firs at 6*d*.	5	0	0
	Rye-grass and Clover seeds	2	0	0
	Planting the hollies and the above trees with the greatest possible care, including mulching with littery stable-dung	6	0	0
	Allow for a temporary Gate to the entrance from the New Huntingdon Road, for unforeseen expenses, and for superintendence	37	1	10
		£600	0	0

Should it be desired to reduce the above estimate, the means are as follows: —

	£	s.	d.
Omit altogether the gravel walk on the terrace, and let it be a grass walk	24	0	0
Form only one half of the surface into beds, leaving the other half to be formed by the curator at convenience; deduct, say	60	0	0
Drain only one half instead of the whole; deduct, say	50	0	0
Instead of pines, cedars, and yews, plant Scotch pines instead of the Taurian pines, and spruce firs instead of the Irish yews, to be clipped into cones and pyramids, by which a saving will be made of	12	0	0
	£146	0	0

Rules and Regulations for the Management of the Cemetery.—The general management being invested by the company in the directors, they have appointed a secretary and a curator, and the latter shall appoint graves-men and body-bearers.

Duty of the Secretary.—To keep the cemetery books, and communicate between the directors and the curator. To concoct with the directors a scale of prices for interments, as well as a set of rules and regulations, to be varied from time to time, as trial and convenience may justify.

Duties of the Curator.—To take his instructions from the secretary. To receive the burial fees, but no perquisites. To devote the whole of his time, or only a certain portion of it, to the cemetery, as may be agreed on; the remainder of the time, if any, to be employed in the plots of ground which he is supposed to rent from the company for a few years at first, &c., as before explained.

To superintend the opening of every grave, and take special care that no coffin is placed nearer the surface than 6 ft.; and that, when more than one coffin is placed in a grave which is filled in with earth, there shall be at least 6 ft. between the coffins, unless the two coffins are deposited at the same time, in which case the one may be placed on the other.

To take special care that a protecting stone [before described, p. 216.] be placed in every grave filled in with earth, that is to be reopened, at the proper distance (6 ft.) above the last-deposited coffin; and to take care that, when a grave with a protecting stone is reopened, the protecting stone shall be taken out, and again replaced at the proper distance, or taken away altogether if the grave is to be finally closed.

To attend in like manner to the interments made by hermetically sealing up the separate coffins, whether by intervening flag-stones, or by embedding them in cement as before described.

To keep the whole of the grounds in the neatest possible manner; to watch the progress of the trees and hedge plants, and stake them when loosened by the wind, or water them when dry. To see that all the implements, planks, &c., are kept in order, and laid up in their proper places.

To pay the graves-men and body-bearers according to some scale, either of fees, or by the day, as may be arranged after ascertaining the rates of payment in the Cambridge churchyards.

[The remainder is omitted, as being either too local to be generally useful, or so general as to be included in Divisions II., III., and VII.]

(*To be continued.*)

Art. III. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By James Barnes, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 306.)

Letter XV. *The Rust in Grapes.*

In the course of my practice I have seen grapes in different noblemen's and gentlemen's places much injured by what is termed the rust. I have heard various opinions given regarding the cause of this injurious pest, which I need not now enlarge on; but I will here briefly state a few facts amongst the many I have observed, which have caused or induced rust on grapes. I have been long fully persuaded, or rather convinced, that it is produced by the treatment they receive inside, and not in any way through the bottom or border. The season is now so far advanced that every one who has vines under glass has them progressing in some stage; and some of your numerous readers, perhaps, will be able to ascertain in this present season some one or other of the causes I have observed, and which I am about to mention. Prevention certainly is better than cure; and, as the causes which produce either disease or vermin are not natural, how often do we see the one brought on in attempting to destroy or expel the other!

A nobleman's gardener some years ago called on me, and wondered how it was he never had seen red spiders or rust amongst the vines under my charge, as he was continually pestered with both. He then had three houses of grapes in different stages coming on, and the red spider was making sad ravages with the earliest house, which was at the time about stoning. The man asked me how he could expel the pest. I readily told him to dredge the flues cautiously with sulphur vivum; for, without caution, the remedy would prove worse than the evil. The man used the sulphur on the flues when hot, and also steamed them when hot; the consequence was, his grapes that had previously been clear from rust were immediately affected with it.

Another gentleman's gardener, of the old school, had a fine large vinery, with the vines trained under the rafters in a complete bundle or faggot. His vines were constantly troubled with all the injurious diseases and vermin; and he attributed it to the bad bottom, which was every thing that a man could wish, lying high and dry, with a subsoil of open loose gravel and sand, to a great depth. That man always made it a rule to water the flues when warm, to keep the red spider down, as he said: which was not only the means of increasing the spider, but brought him the rust into the bargain: and, no doubt, he still continues the same unnatural treatment.

I have seen rust brought on grapes by allowing the house to continue shut too long without air in the morning, and then, suddenly opening it when the external air was cold and chilly; the sudden change produced rust on different parts where the current of cold air was strongest. I have seen the rust produced by syringing with cold water; likewise through unskilful handling in thinning out the bunches, more particularly when thinning has been done late in the morning, and the vapour has been allowed to rise on the fruit before the house has had air given to it. It is sudden checks that produce rust generally, such as we ought to guard against in houses, pits, &c., of all kinds and for all purposes. Out of doors we often see it produced after a sudden change from still, warm, growing weather to stormy, cold, and windy weather; not only on grapes, but on plums, apricots, pears, &c., more particularly when the fruit has been in a tender, thriving, growing state.

I have always noticed out of doors, after a storm with driving wind, if the sun break out suddenly on the tender fruit before it is dry or has had one night's repose, the rust is certain to make its appearance; therefore, I always make it a rule to guard against sudden changes with every thing under glass.

Some day soon I will write you a letter on the system I follow all through with grape-growing, if acceptable. [It will be particularly so.]

Bicton Gardens, April 29. 1843.

Art. IV. *On protecting Fruit Trees against Walls.* By N. M. T.

During your journey through Scotland, as detailed in the *Gardener's Magazine*, I find a paragraph censuring the Scotch generally for not affording their fruit trees adequate protection while in bloom. I made a memorandum of the said paragraph at the time; and, after another year's experience, I would ask, Are you certain that protection, even the most popular sort of protection, confers the benefits imagined? or, rather, is it not a positive injury? These questions must appear very foolish to the mass of practitioners: a few years ago to me they would have appeared superlatively so; but my views are now changed, and it will not be a trifle that will restore the reputation of such protection to the place it held in my estimation. Some occurrences make a deeper impression than others of equal import, from the circumstances which attend them. This was particularly the case with regard to the experiments about to be detailed; and if, by any possibility, I can avoid being too prolix, I will detail those circumstances, as the best means of rendering the care with which the experiments were performed apparent, which may, I hope, induce others to repeat them, as the subject is of much importance.

In 1839, the trees under my care being in a most exposed situation, and altogether unprotected, I prevailed upon my employer to allow me to procure enough of the most approved material to sufficiently protect the whole against the coming spring. Cow-hair netting was at the time being advertised, strongly (and I still think justly) recommended as possessing most of the qualities requisite for such a purpose. This sort was determined upon, and purchased accordingly. The material highly pleased me; and, not content with doing well (as I fancied) myself, I used my utmost endeavours to persuade others to do likewise, and in several cases succeeded. But a near neighbour stoutly resisted all arguments that could be brought to bear on the subject: I might talk of the blighting influence of cutting winds and hoarfrosts until I was hoarse; he remained obstinate, declaring that he had no doubt of his crops being as good as mine; and, if they were not, he would not impute the blame to want of protection. Consequently I gave him up as impracticable, setting him down (as mankind generally do those opposed to them in matters of opinion) as steeped in the most pitiable ignorance; to remove which, I begged him to watch the progress, and mark the result, of the practice which I (following the best practical authorities, the fruitful source of so many errors) so strongly recommended; and concluded with a wish that the coming spring might be such as would, by its severity, test the merits of the appliance. In this I was amply accommodated; the spring was such that, in this quarter at least, it will be remembered by fruit-growers; and, during the continuance of the boisterous, chilling, east winds that then proved so destructive to the bloom, if I did not feel half-pleased (which I am afraid I did) to think that my friend's trees were exposed to its unmitigated severity, I was highly gratified to think mine were snug beneath their truly comfortable-looking covering. The walls here are supported by buttresses, projecting a foot beyond the wall at bottom, and tapering to nothing at top; into these strong iron eyes are fixed, through which three strong wires were stretched at equal distances, to which the netting was securely fastened, fully extended, presenting a formidable array of bristles, yet withal obstructing so little light, from the material itself being half-transparent, that we deemed their removal at any time unnecessary.

For a long time all seemed to do well; the bloom was splendid; certainly finer than that unprotected; but, when the fruit ought to have swelled off, all dropped, and the failure was complete. That what is meant by complete failure may be properly understood, I may state that there were not three dozen fruit upon 500 square yards of wall. A most striking proof of the injury done by covering so applied was accidentally furnished upon a wall against which young low trees were planted: a net covering only the lower half of the wall completely protected all these, except one; this had reached the top, consequently there was a deltoid-like piece above the net totally uncovered, which, nevertheless, produced more fruit than all the wall besides, the covered part being as bad as the protected trees generally.

Thus I was compelled to own to my observant antagonist that defeat was complete; but I concluded (as half your practical readers must have done) that the disaster was entirely owing to the misapplication of a principle which I now, for the first time, doubted. I freely granted this error in judgement; and, now that attention was directed to the subject, I resolved upon increased vigilance during another season, when the netting, instead of being fastened to the horizontal wires, was furnished with rings to slide upon them, and was, I need not add, carefully removed every day that was the least favourable. The promise was again great, and success seemed certain; but, alas! the result was anything but satisfactory; that is, trees totally exposed bore better. I now began to think the benefit conferred by covering of at least a very negative description; and, in the spring of 1842, the netting was put in its place, and applied in cases of severity only, and again without any perceptible advantage; so that I resolved, be the spring of 1843 what it might, I would leave all to chance. This was strictly adhered to, and the crops are more than doubled. It may be urged, that the present is a season that seems to produce an excess of most kinds of fruit: granted; but, upon the other hand, it has also been a season above all others rendering protection, according to established notions, indispensable. March here was fine beyond all precedent; the continued warmth exciting too rapid vegetation, and rendering the check caused by excessive cold during April so keenly felt. So great indeed the change, that a thermometer suspended from a branch of a peach tree while in bloom fell to 28°; potatoes in the border were completely killed; strong ice being formed several nights successively. Here, protection would seem most desirable; yet I have ascertained where it was applied without conferring any benefit.

I mentioned in the beginning of this paper that several persons procured and applied the same sort of protection at the same time; and, being anxious to know how they had succeeded, previously to sending you this, I visited the place where it had been most extensively employed, and found, by a singular coincidence, that this spring there also it had been discontinued; with the exception of a large apricot, which was sheltered when the change in the weather became apparent, and there is not the tenth part of a crop upon it. I do not say protection destroyed that crop; but it proved wholly powerless to save it. Here, then, is the corroboration of a truly practical man, placed where fruit is a first consideration, practically convinced that protection, as usually applied, is totally useless.

I now very much regret that I did not this season, as a conclusive test, cover part of several trees, the only correct method of determining its value; as trees covered, and trees uncovered, however near or similarly situated, are liable to be affected by unseen agents, and their success or failure thus rendered of little weight.

Without entering at all into the theory of the subject, I have contented myself with a statement of facts with the hope of causing an investigation; and have said enough, I think, to effect this. It would be needless to appeal to your readers generally, as what is every body's business is seldom performed by any body: but, could you particularise a few individuals that would be guided by what occurred rather than by preconceived notions, the benefit conferred by their investigations would be useful to vast numbers that are, at vast trouble and expense, destroying half the produce of their trees, in case they are found unnecessary; and lead to something more determinate as to the mode of application, and the material to be employed, if they are really useful.

I have mentioned the cow-hair netting, as the material employed in the cases adverted to, and it is possible that vegetable fibre, similarly employed, might produce a different effect; at least, there is room for enquiry.

The atmosphere being made up of so many, and, after all, of so little understood, elements, it is impossible to say what changes may take place by its passing through such an obstruction as even a suspended net; and considering, also, the incomprehensible agency employed in the fertilisation of plants, this change may be more serious than at first sight would appear credible. If electricity, which so universally pervades space, bears an active hand, the material used becomes momentous, and renders it not improbable that the millions of hirsute points protruding from a hair net exercise an influence, injurious or otherwise. But all this I would leave to abler hands, satisfied with merely naming such points as worthy of being taken into account in the investigation.

Folkstone, *May* 13. 1842.

ART. V. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 308.)

THE design *fig.* 89. is for a flower-garden in the Elizabethan style, in a sunk panel; the beds are separated by grass paths 2 ft. wide, and the surrounding gravel walks, *a* and *b*, are 6 ft. wide. The walk *a* is six steps of 6 in. each, or 3 ft., above the level of the border *d*, and lower walk *b*. The ground is kept up to the higher level by the parapet wall *c*, which has piers at regular distances surmounted by vases; and at each of the flights of steps there are two statues; one on each side of the entrance at the upper steps, and a vase at each side of the lower steps. To harmonise with these statues there are in the flower-garden four, in the centre of as many beds, one of which is marked *k*. There is supposed to be a fountain in the centre of the basin *q*, which may be either a jet or a drooping fountain, according to the height and abundance of the supply of water. If the supply is direct from a hydraulic ram, a drooping fountain will be preferable, and the effect of the regular pulsations of the ram will be found very interesting. The border within the parapet wall is supposed to be planted with low-flowering shrubs, chiefly rhododendrons, azaleas, and other *Ericàceæ*, including also mahonias, daphnes, cistus, genista, cytisus, coronilla, &c., selected so as to exhibit a show of flower from April to September. All the beds of the form *e* may be planted with white flowers; those of the form *f* with purple flowers, one plant of a species or variety, and so selected and disposed as to have as nearly as practicable an equal number of species in flower throughout the season, and the highest plants in the middle of the bed, sloping gradually to the margins. There ought, however, neither in this bed nor in any other of this design, to be any flowers planted which grow higher than 18 in., and all the smaller beds ought to be planted with flowers which do not exceed 9 in. in height. In all the beds every plant ought to stand distinct, and there ought not to be two of a kind throughout the whole flower-garden. Hence there will be no plants in this garden that want either pegging down or tying up; and if it is planted with perennials, without either bulbs or annuals, it will occasion very little trouble to keep it in order, and will look well all the year. Each bed may have a number, and a list may be kept of the plants contained in it, which will be less formal than numbering or naming each plant separately, and will be a better exercise for persons desirous of knowing the names.

The beds of the form marked *g* may be planted with yellow flowers simi-

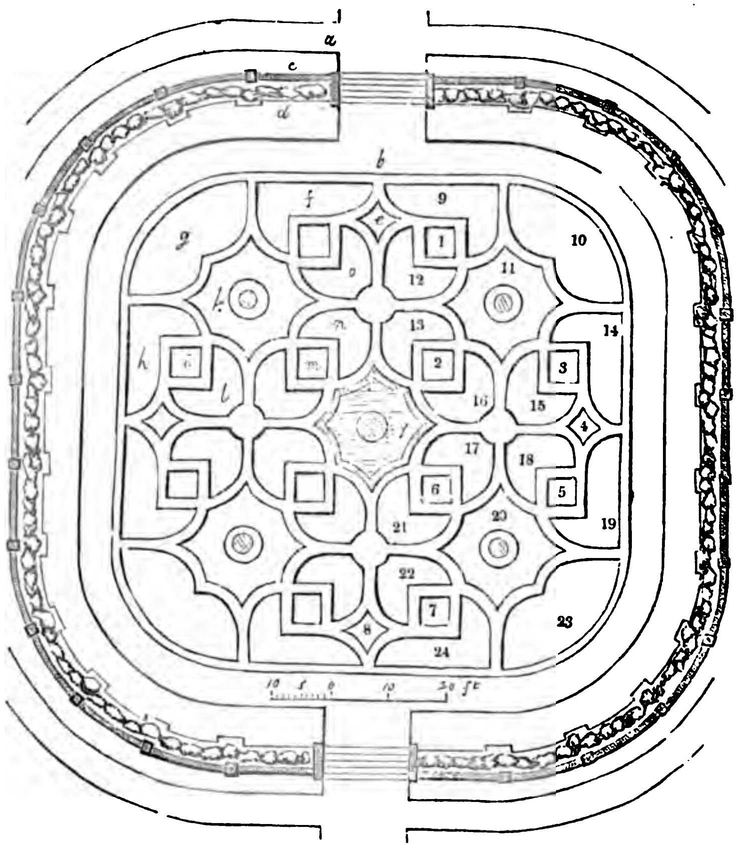


Fig. 89. *Elizabethan Flower-Garden in a sunk Panel.*

larly arranged to those in the bed *f*; those marked *h*, with purple flowers; the bed marked *i*, and those corresponding with it, may be planted with blue flowers. The flowers in *l*, and the corresponding beds, may be orange; and the four beds, of which one is marked *m*, may be yellow. Instead of having the beds *l* planted with orange flowers, those corresponding with *n* may have white flowers, and the orange may be limited to those corresponding with *o*.

On the supposition that no fountain of any kind is to be placed in the central basin, so as to form the main object when descending the steps at both entrances, then the bed *e*, and the three beds which correspond to it, may be occupied by pedestals and statues, which, with the statues in the centres of the beds *k*, will give a running architectural foreground to the spectator from the lower walk *b*, and a middle distance to the spectator from the upper or terrace walk *a*, whose foreground, looking towards the garden, will be the parapet crowned with vases *e*.

This design may be varied in the following manner: instead of crowning the supporting wall *c* with piers and vases, it need not be carried up higher than the surface of the terrace, and may have a hedge of box planted over it, which may be kept clipped so as to exhibit piers, either crowned with vases of box, or with pyramids; or the hedge may be cut so as simply to form a verdant wall with piers at regular distances; or it may be cut so as to form a low open arcade. But, as to produce any of these results will require the box to grow three or four years, even if it should be 4 ft. high when planted, an effect may be produced the first year by planting giant ivy, and training it on a frame of wirework.

Instead of a hedge of box or of yew, a hedge of common juniper may be planted, and instead of piers or pyramids clipped into shape, Swedish or Irish junipers may be introduced in the hedge at regular distances, or a hedge of green holly may be planted, and the standards may be of variegated holly.

In the sunk panel a grass plot may be substituted for the central basin, and Irish junipers, Irish yews, variegated yews, or cypresses, for the statues in the centres of the beds *k*, and for the beds *e*.

The paths between the beds, instead of being of grass, may be paved with brick, tiles, or stone, asphalte or cement, or they may be formed of gravel with box edgings. The centre, in the case of the walks not being of grass, may either be of grass with a gravel or paved walk surrounding it, or it may be an open arcade of trelliswork covered with roses, and there may be a fountain in the centre of this bower of roses, as in the Duchess of Bedford's garden at Camden Hill.

In all sunk gardens of this kind, and indeed in all flower-gardens whatever, great care ought to be taken not to surround them with walls, hedges, shrubbery, arcades of roses or other climbers, or in short any boundary which will exclude the free circulation of air, and the direct rays of the sun, for at least the greater part of every day throughout the growing season.

For the sake of those who would prefer covering the beds with summer flowers so as to exhibit one mass of colour produced by one plant in each bed, we have numbered one half of the beds, which may be planted as below; the other half being a duplicate of this half.

1. Blue. Campánula carpática.
2. Yellow. *Œ*nothèra macrocárpa.
3. Blue. *S*álvia *c*hamædryöìdes.
4. White. *I*bèris coronària.
5. Blue. Clintòn*ia* pulchélla.
6. Yellow. Calceolària angustifòlia.
7. Blue. Nemóphila insígnis.
8. White. The Queen Verbena.
9. Purple. Godèt*ia* bìfrons.
10. Yellow. Calceolària rugòsa.
11. Scarlet. Frogmore Pelargonium.
12. Orange. *E*rýsimum Perowski*à*-*num*.
13. Orange. Eschschóltz*ia* cròcea.
14. Lilac. *V*erbèna amœ̀na.
15. White variegated. *V*erbèna *teu*-*criöìdes*.
16. White variegated. *Pelùñia* erubéscens.
17. White variegated. Leptosìphon *a*ndrosàceus.
18. White variegated. Collínsi*a* bícolor.
19. Lilac. Clárk*ia* élegans.
20. Scarlet. Bouvárd*ia* coccínea.
21. Orange. Tropæ`olum mìnus flòre plèno.
22. Orange. Eschschóltz*ia* califórnica var.
23. Yellow. *Œ*nothèra Drummónd*ii*.
24. Purple. *L*upìnus nànus.
25. (*e* in the figure.) White. Nemóphila atomària.

(*To be continued.*)

Art. VI. *List of the earliest and freest growing and flowering Chrysanthemums adapted for Cultivation in the colder Parts of the Country, and more particularly in Scotland.* By Messrs. Chandler and Sons.

[The following list was kindly sent us by Messrs. Chandler and Sons for a friend in the West of Scotland. The plants are 1*s*. each, and they were sent by post.]

Adventure, yellow.
Arago, buff and red.
Bícolor, white and yellow.
Beauty, pale lilac.

Conqueror, white.
Coronet, white.
Campestroni, purple.
Casimir Perrier, small crimson.
Celestial, blush.
Duc de Conigliano, crimson.
Empress, lilac.
Floribúndum, dark lilac.
Flechier, dark rose.
Formòsum, white and yellow.
Goliath, white.
Gránde, flesh colour.
Gouvain St. Cyr, orange.
Imperial, pale lilac.
La Superbe, blush white.
Lùcidum, white.
Marchioness, white.
Mirábile, white and buff.
Magnet, yellow.
Marquis, light rose.
Minerva, pink and white.
Marie, red.
Madame Pompadour, dark rose.
Princess Marie, light pink.
Perspícuum, pink.
Queen, deep rose.
Rosalind, pink.
Surprise, white.
Triumphant, pink and buff.
Theresa, red.
Vesta, white.
Victory, white.

Vauxhall Nursery, May 2. 1843.

REVIEWS.

Art. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

The Zoologist: an Illustrated Monthly Magazine of Natural History, and Journal for recording Facts and Anecdotes relating to Quadrupeds, Birds, Reptiles, Fishes, Annelides, Insects, Worms, Zoophytes, &c.; their Habits, Retreats, occasional Appearance, Migrations, Nests, and Young. Nos. I. to V. 8vo. London, 1843. Continued monthly.

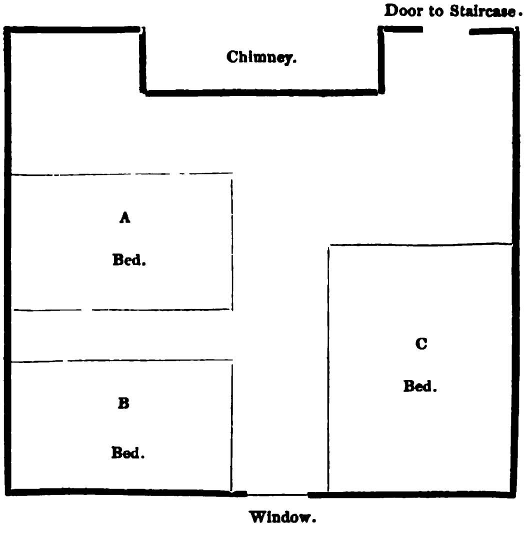
This is a carefully got up and judiciously conducted periodical, blending scientific with popular description, after the manner of our *Magazine of Natural History*. Among the contributors are Mr. Waterton and many other field, as well as book, naturalists. The numbers being only a shilling each, a gardener fond of natural history could not meet with a more suitable periodical than the *Zoologist*.

A History of British Birds. By William Yarrell, F.L.S., V.P.Z.S. Illustrated by a woodcut of each species and numerous vignettes. 3 vols. 8vo. London, 1843.

This is by far the best book on birds which has ever been published, and we can therefore strongly recommend it to our readers.

Reports of Special Assistant Poor Law Commissioners on the Employment of Women and Children in Agriculture. Presented to both Houses of Parliament by Command of Her Majesty. 8vo, pp. 378. London, 1843.

There are many facts in these *Reports* in favour of cottage gardens and small cottage allotments, from a few poles up to a quarter of an acre in extent. There are also other facts proving the deplorable state of the cottages in all the districts examined, with the exception of one place in Surrey, in which it is stated that "great pains are taken generally to improve the home of the agricultural family, as well by furnishing opportunities for proper habits in the erection of good cottages, as by the direct encouragement of prizes for neat cottage interiors and gardens. (p. 148.) The general condition of the cottages, however, more frequently resembles those in the neighbourhood of Blandford. "The want of sufficient accommodation seems universal. Cottages generally have only two bed-rooms (with very rare exceptions); a great many have only one. The consequence is, that it is very often extremely difficult, if not impossible, to divide a family so that grown-up persons of different sexes, brothers and sisters, fathers and daughters, do not sleep in the same room. Three or four persons not unfrequently sleep in the same bed. In a few instances I found that two families, neighbours, arranged so that the females of both families slept together in one cottage and the males in the other; but such an arrangement is very rare, and in the generality of cottages I believe that the only attempt that is or that can be made to separate beds, with occupants of different sexes, and necessarily placed close together from the smallness of the rooms, is an old shawl or some article of dress suspended as a curtain between them. At Stourpain, a village near Blandford, I measured a bed-room in a cottage consisting of two rooms, the bed-room in question up stairs, and a room on the ground floor in which the family lived during the day. There were eleven in the family: and the aggregate earnings in money were 16*s.* 6*d.* weekly (Dec. 1842), with certain advantages, the principal being the father's title to a grist of a bushel of corn a week, at 1*s.* below the market price, his fuel carted for him, &c. They had also an allotment of a quarter of an acre, for which they paid a rent of 7*s.* 7*d.* a year. The following diagram shows the shape of the room and the position of the three beds, A, B, C, it contained. The room was 10 ft. square, not reckoning the two small recesses by the sides of the chimney, about 18 in. deep. The roof was the thatch, the middle of the chamber being about 7 ft. high. Opposite the fire-place was a small window, about 15 in. square, the only one to the room.



" Bed A was occupied by the father and mother, a little boy, Jeremiah, aged 1¼ year, and an infant aged 4 months.

" Bed B was occupied by the three daughters,—the two eldest, Sarah and Elizabeth, twins, aged 20; and Mary, aged 7.

" Bed C was occupied by the four sons,—Silas, aged 17; John, aged 15; James, aged 14; and Elias, aged 10.

" There was no curtain, or any kind of separation between the beds.

" This I was told was not an extraordinary case; but that, more or less, every bed-room in the village was crowded with inmates of both sexes, of various ages, and that such a state of things was caused by the want of cottages.

"It is impossible not to be struck, in visiting the dwellings of the agricultural labourers, with the general want of new cottages, notwithstanding the universal increase of population. Everywhere the cottages are old, and frequently in a state of decay, and are consequently ill adapted for their increased number of inmates of late years. The floor of the room in which the family live during the day is always of stone in these counties, and wet or damp through the winter months, being frequently lower than the soil outside. The situation of the cottage is often extremely bad, no attention having been paid at the time of its building to facilities for draining. Cottages are frequently erected on a dead level, so that water cannot escape; and sometimes on spots lower than the surrounding ground. In the village of Stourpain, in Dorsetshire, there is a row of several labourers' cottages, mostly joining each other, and fronting the street, in the middle of which is an open gutter. There are two or three narrow passages leading from the street, between the houses, to the back of them. Behind the cottages the ground rises rather abruptly; and about three yards up the elevation are placed the pigsties and privies of the cottages. There are also shallow excavations, the receptacles apparently of all the dirt of the families. The matter constantly escaping from the pigsties, privies, &c., is allowed to find its way through the passages between the cottages into the gutter in the street, so that the cottages are nearly surrounded by streams of filth. It was in these cottages that a malignant typhus broke out about two years ago, which afterwards spread through the village. The bed-room I have above described is in one of them."

It were much to be desired that every landed proprietor would have a Report made of the actual condition of the cottages on his estate; not by the resident steward, whose interest it might be to disguise their actual state, but by a stranger. But much good might be done by the personal inspection of the proprietor himself. Gentlemen in the country enter into the details of their farmyards, stables, dog-kennels, and pigsties. Why should not they pay some attention to the dwellings of human beings? Would ameliorating the condition of their labourers afford them less satisfaction than providing for their cows and horses? But almost every thing in this country depends on fashion. Could it once be rendered fashionable to improve the dwellings of agricultural labourers, how wonderful would be the change in the appearance of the country, and in the comforts of country labourers; and, in the course of a generation, in the morals of the working classes. What the consequence will be, if things are allowed to go on in their present state, with our hourly increasing population, it is fearful to contemplate.

The Art of Living. By Dr. Henry Duhring. 8vo, pp. 144. London and New York, 1843.

The most useful branch of useful knowledge, Dr. Duhring observes, is that which "teaches us, in what manner, and by what means, we may hope to render our existence as pleasant or happy as it possibly can be." He does not propose to enter fully into the subject, but has preferred singling out for discussion and illustration the five following principles:—

"*First Principle.*—The nature of human life is *twofold*, mental and physical; and human happiness is the result of the well-being and harmony of both.

"*Second Principle.*—Providence has constituted us with a view to activity; and in accordance with this law of our nature, *labour*, either of the mind or body, is the only source or means of our enjoyment.

"*Third Principle.*—As the human machine, like a common piece of mechanism, wears out most rapidly where there is the greatest friction and straining, relaxation of both our mind and body is an indispensable condition to man's happiness.

"*Fourth Principle.*—The study of nature, and the practice of horticulture, constitute the surest foundation of man's happiness.

"*Fifth Principle.*—There is nothing to be found in the wide world so pregnant with satisfaction, interest, and happiness, as the associations that cling to a happy home."

"To make us feel, appreciate, and relish whatever pleasures our existence is capable of affording, delicacy and purity of mind and heart, and health of body, are the most indispensable requisites. But, above all, let us strive to improve our mind; for to insure our happiness against every possible vicissitude, we must endeavour to create for ourselves enjoyments always at our command, in whatever circumstances we may be placed."

The work may be read with profit and pleasure.

An Inaugural Lecture on Botany, considered as a Science, and as a Branch of Medical Education. Read in King's College, London, May 8th, 1843. By Edward Forbes, F.L.S., F.B.S., Professor of Botany in King's College, London. Pamph. 8vo, pp. 23. London, 1843.

A highly philosophical discourse, in which botany is viewed in its relations to medicine; and to a certain extent to agriculture, chemistry, zoology and geology; and justice is done to the memory of Linnæus. "In saying these few words in favour of the Linnæan system, I know I am pleading an unpopular cause; but I speak out freely, partly because I mean to proceed on a different basis in conducting the botanical studies here, and partly because, after the once over-enthusiastic attachment to the Linnæan method which prevailed so long in Britain, and which was carried so far as to impede the progress of botany, a reaction has taken place which threatens to blind the eyes of the younger botanists to the merits of a device which was, and ever will be, a most valuable auxiliary of the science."

Manual of British Botany, containing the Flowering Plants and Ferns, arranged according to the Natural Orders. By Charles C. Babington, M.A., F.L.S., G.S., &c. Small 8vo, pp. 400. London, 1843.

There are already so many British floras that we were curious to know on what grounds Mr. Babington has added to their number. He himself says, he could not expect that after the labours of Smith, Hooker, Lindley, and others, and the publication of so invaluable and unrivalled a collection of figures as is contained in Sowerby's *English Botany*, there could be many questions left undetermined. "He had not however advanced far in the critical examination of our native plants before he found that a careful comparison of indigenous specimens with the works of eminent Continental authors, and with plants obtained from other parts of Europe, must necessarily be made; for it appeared that in very many cases the nomenclature employed in England was different from that used in other countries, that often plants considered as varieties here were held to be distinct species abroad, that several of our species were only looked upon as varieties by them, and also that the mode of grouping into genera was frequently essentially different.

"The discovery of these facts produced considerable astonishment, and the author was led to consider what could have been the causes of so remarkable a discrepancy. The following appears to be the most probable explanation. It is well known that at the close of the last century Sir J. E. Smith became the fortunate possessor of the Herbarium of Linnæus, and was thus enabled to ascertain, with very considerable accuracy, the British species which were known to that distinguished man, and to publish, in the most improved form that he had given to his system, a remarkably complete and excellent Flora of Britain. Then followed the long-continued separation of this country from France, and indeed from most of the European nations, by which we were almost completely prevented from observing the progress which botanical science was making in other countries, and at the same time our own flora was continually receiving accessions of new plants which it was nearly impossible to identify with the species detected and published in France and Germany. At the conclusion of the war we had become so wedded to the system of Linnæus, and it may even perhaps be allowable to add, so well satisfied with our own proficiency, that, with the honourable exception of Mr. Brown, there was at that time scarcely a botanist in Britain who took any interest in, or paid the least attention to, the classification by natural orders which had been adopted in France, and to the more minute and accurate examination of plants which was caused by the employment of that philosophical arrangement. Let it not, however, be supposed that the author wishes at all to detract from the value of the Linnæan system — a system which was considered by its author as merely a provisional arrangement, or kind of index to the known plants; for no botanist has more strongly stated the value of a natural classification than Linnæus himself, — as he fully believes that without some such artificial scheme by which newly discovered plants could be catalogued for easy reference, the multitudinous species which distant countries have supplied would long since have formed so enormous and confused a mass as to have reduced botany to a state little better than that into which it had fallen at the commencement of the Linnæan era."

The work is intended to be a field book or travelling companion for botanists, but it has, what we consider a very great deficiency, viz., "synonymes have been almost wholly omitted." It is true that references to figures are given, but that, in our opinion, will not compensate for the want of synonymes, more especially to the travelling botanist; while, in a historical point of view, it prevents us from connecting the work with other floras of the same kind which have gone before it. In every other respect we like the book much.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Domestic Notices.*

ENGLAND.

The Horticultural Society of London held its first show in the Chiswick Garden on May 13th: it was as well attended as usual, and the specimens of superior culture, in various instances, surpassed those ever before exhibited. Their arrangement in the tents also was better. See the *Gardener's Chronicle* of May 20.

The Royal Botanic Society of London held its first exhibition for the season in its gardens in the Inner Circle, Regent's Park, on the 24th of May, when many of the best plants exhibited in the Chiswick Garden were again displayed. The meeting was well attended, and the progress made in laying out the garden seemed to give general satisfaction. In short this garden, without in the slightest degree interfering with any other, is already affording a very high degree of enjoyment and intellectual entertainment to the families in the neighbourhood. Very great praise is due to the committee of management, and to the curator, Mr. Marnock.

Waterer's Exhibition of American Plants, in the King's Road, has this year, as before, excited general admiration, notwithstanding the gloomy state of the atmosphere. The area in which the plants are planted being covered with canvass suggests the idea that a roof of glass, to be shaded occasionally by canvass, would be better; and also that covering an acre or two in some spot nearer the centre of London would afford an interesting town garden. It might be furnished with plants from the open ground, so as to form a covered promenade throughout the year; but we have often before thrown out the idea. Soho Square would make an excellent garden of this sort, but still better Lincoln's Inn Fields. Mr. Waterer deserves very great credit, not only for the immense expense which he incurs annually in getting up this exhibition, but for the great taste which he displays in arranging the plants; mixing the warm colours of the azaleas with the cold colours of the rhododendrons and kalmias, and relieving the tufted masses of dwarfs with occasional standards. We observed some very interesting foreign varieties. — *Cond.*

ART. II. *Retrospective Criticism.*

CEMETERIES. — In your "Principles of Landscape-Gardening applied to Public Cemeteries" you have not forgotten the poor man, even in death. It is often shameful to witness the disrespect shown to the remains of the poor after they have travelled through a world of pain and sorrow, and in a country too that professes to show much benevolence towards the human race.

I have often felt grieved in witnessing the funeral of the poor, the attendance at times being scarcely sufficient to convey them to their last resting-place, while their oppressors shall have a long train of unnecessary followers accompanying them to the grave. But the glorious prospects which the Christian religion holds out to the believer in Jesus, beyond death and the grave, reconcile the traveller to heaven, in a great measure, to all the scorn and neglect that may befal him in the way: he knows that,

———" Under ground
Precedency 's a jest; vassal and lord,
Grossly familiar, side by side consume."

You have already shown the pernicious effects the living are exposed to by a careless neglect of the dead, and it is really a matter of wonder that that carelessness should still be persisted in. When we think of the disagreeable effluvium which proceeds from a dead mouse or dead mole when decomposing on the surface of the earth or but partially covered, the evil effects upon the living in the neighbourhood of an improper burying-ground must be incalculable.

You have also pointed out (p. 299.) how the funeral expenses have been lessened about the metropolis; and perhaps it may not be uninteresting to some of your readers in the country, to be informed of a cheap and convenient mode of conveying the dead now in use in various parts of Scotland.

West Plean and Auchenbowie are about three miles from the churchyard of St. Ninian's, and it was sometimes found to be very laborious work to carry a dead body when few attended the funeral, especially when the day was wet and the roads dirty. Some time ago it was resolved that a hearse should be got to the place for the use of the inhabitants; a meeting was accordingly called, and the thing set about briskly. Plans were drawn out, and estimates received from the coach builders of Stirling; one was fixed on, and we have now a very neat article which cost about 50*l.* A house was also built for it, which cost nearly 20*l.*, and the whole has only cost the members of the company 7*s.* 6*d.* each. We however, got some assistance from gentlemen and farmers in the neighbourhood: one gave the ground for the house to be built on free; another gave 10*l.*, and another 5*l.*; while the farmers carted the stones, lime, and slates, free of expense. One shilling and sixpence is paid to the keeper of the hearse when it is required; and a farmer seldom charges anything for the use of a horse for two or three hours. A pall or mort-cloth is scarcely ever used since the hearse came to the place. We have handspokes, and a folding-seat for the coffin to rest on when taken from the hearse, so that we do not require those belonging to the parish: this is also a saving. What has been done in one rural district may be done in another; and it has been acknowledged, even by those who were indifferent about it at first, to be a great improvement obtained at a trifling expense.

The members, in forming the regulations regarding the use of the hearse, have not forgotten the poor; even the poorest in the place may have the use of it for their dead, by applying to a committee appointed for the purpose. I hope we shall all be preserved from quicklime burying, and from

———" Gloomy aisles
Black-plaster'd, and hung round with shreds of 'scutcheons
And tatter'd coats of arms;"

and also from the rude hands of the grave-digger after our flesh is consumed; for it is anything but pleasant to see the remains of parents, brothers, sisters, and friends treated in a brutal manner by thoughtless mortals. If the plan were adopted which you have recommended, the air we breathe would become less tainted, and

" The sexton, hoary-headed chronicle,"

would be prevented from delivering grave lectures over the skulls of those he had buried. — *Peter Mackenzie. West Plean, June* 7. 1843.

Cemeteries and Churchyards. — The taste, as well as a general feeling for improvements in our burial-grounds, is unquestionably on the increase; and, whatever internal discord there may be in churches, nobody seems disposed to quarrel with a plan for bettering and beautifying the churchyards. One step is wanting; viz. that it should become the fashion. Since you warmed me up upon the subject, I cannot tell you with what disgust I have looked upon the disgraceful condition of the churchyards I happen to have been in. Sunning Hill is one. There are the remains of very eminent men reposing there; Sir Home Popham, George Ellis, and General Fitzpatrick: and the place is overrun with rank dank weeds, suited to cover the remains of dead dogs, but most offensive when we think of the men whose last resting-places they dishonour; or, rather, the dishonour attaches to those who continue the practice of totally disregarding the state of our burial-grounds. Having often spoken upon the subject of late, I am glad to think that everybody acknowledges this; and, when a few examples have introduced the fashion, we may expect, I think, a general amelioration. In the mean time, I hope the national cemetery may not be lost sight of. There is a bill now before parliament, and which is extremely likely to pass, to facilitate the enclosure of waste lands. Such an act might very much facilitate the business of a company disposed to carry into execution your plan in the neighbourhood of Woking. The same machinery for effecting the enclosure of a parish thereabouts would give a company legal possession of the tract they might purchase of the parish as the ground of their operations. The bill itself promises great general benefit; and I hope, with all my heart, it may pass. With the aid of such men as you mention, Mr. Mackinnon and Mr. Hume, and I should add Sir John Easthope, if he would cooperate, it seems as if a company of the highest order would soon spring into existence, and produce something worthy to be deemed general and national. — *H. A. M. June* 12. 1843.

ART. III. *Obituary.*

DIED suddenly, on the 6th of June, *John Penn, Esq.*, of Lewisham, aged 72 years. Mr. Penn has been well known for many years as a civil engineer in very extensive business. Of late years he became much attached to gardening, and invented the mode of warming and ventilating which bears his name. He was a man of powerful intellect, liberal in his opinions, most kind and benevolent to his workmen, and universally respected and beloved.

Dropped down while walking in his nursery, and, a few minutes after he had returned to his house, died, on June 1., *Mr. John Milne*, Nurseryman, Stoke Newington.

THE

GARDENER'S MAGAZINE,

AUGUST, 1843.

ORIGINAL COMMUNICATIONS.

ART. I. *Comparative Physiology.* By R. LYMBURN.

(*Continued from* p. 352.)

IN Chap. III., *On the Laws of Organic Developement,* Dr. Carpenter remarks "that, though the labours of the naturalist and comparative anatomist have not yet established laws of the highest degree of generality, yet many subordinate principles have been based on a solid foundation, and many at first doubtful are daily receiving fresh confirmation. The most important part of the process of induction consists in seizing upon the probable connecting relation, by which we can extend what we observe in a few cases to all. In proportion to the justness of this assumption, and the correctness of our judgement in tracing and adopting it, will the induction be successful. The more extensive the acquaintance with nature, the more firmly is the belief impressed that some relation must subsist in all cases, however little we may be able to trace. It was formerly customary to regard similarity of external form and evident purpose as indicating the analogies between different parts, but the developement of the functions is often found to originate in sources entirely different. The wings of birds, &c., are formed by expansions of the general integument over the anterior parts of the osseous system, while in insects they are formed by prolongations of the respiratory apparatus. In vegetables, the *tendril* is developed in the vine from the peduncle or flower-stalk; in the pea, from the petiole or leaf-stalk; in Gloriòsa, from the point of the leaf; and, in the singular genus Strophánthus, from the point of the petal. Function, therefore, is not dependent on developement, nor on structural analogy. There is little resemblance between the gills of a fish and the lungs of a quadruped, or the air tubes ramifying through the structure of an insect; and those who are in the habit of forming exclusive notions upon a hasty survey might be led to deny that any real analogy could exist. The essential character of the function, however, is to bring the circulating fluid (blood or sap) into due relation with the atmosphere; and all that is needed is a membrane which shall be in contact with the air on one side, and the circulating fluid on the other. In all the forms of respiratory apparatus there is the same essential character, and their modifications are only to adapt them to the conditions of the structure at large. There is, *functionally* considered, a *unity of composition,* although not really analogous in *structural* character. In the vegetable kingdom, organs which correspond in structure, connexions, and developement, are observed to assume the most varied forms, and perform the most different functions.

"It has been maintained by some physiologists, that the same elementary parts exist in all animals, and the only difference between the various classes is in the respective developement of these parts. This is, however, true only in a restricted sense. In the Vertebràta, the skeleton of the fish may be shown to be composed of the same parts as that of a bird or quadruped, though the form of individual bones may be totally dissimilar; the lungs of the air-breathing Vertebràta exist in a rudimentary condition in fishes, some of the higher classes having the rudiments of a bronchial apparatus. Among the Articulàta the same correspondence may be traced; but the classes of this division will not admit of being compared with those of Vertebràta. There are many plants which bear stamens only in one set of flowers, and pistils in another; and these may be caused to produce flowers entirely perfect, by supplying nourishment enough to develope the rudimentary organs. When any new function, or great modification of function, is to be performed, no entirely new structure is evolved for that purpose, the end being attained by a modification in some structure already present. In all the *great divisions* of organic beings, there is a fundamental correspondence amongst the different organs. Nature appears to have kept in view a certain definite type or standard, to which she has a decided tendency to conform, and departs from the original plan only to accommodate herself to certain specific and ulterior objects peculiar to particular races of created beings. This unity of composition, however, is sometimes interfered with, by the tendency of one division to approach to another, producing organs characteristic of an approximate division. The *functional* character of the organs furnishes a more general analogy than any we can trace from *structure* alone. The simplest plant differs from the most complex, principally, in that the whole surface participates in all the operations of absorption, exhalation, and respiration, which connect it with the external world; while, in the more complex higher plants, those functions are confined to certain portions of the surface. The leaves and roots of the higher plants have a functional analogy with the simple membrane of the algæ, which absorbs and respires. Even in the highest animals, the organs adapted to those functions are essentially composed of a simple membrane, a prolongation of the external surface. The respiratory organs of plants are prolonged externally, like the gills of fishes: in terrestrial animals they are internal; the membrane of the tubes or cells exposing a large surface. The absorbing organs of plants are prolonged into the soil, while in animals they are distributed upon the walls of a cavity, fitted to prepare and retain the food. Still the same fundamental unity exists, and the spongioles in vascular plants, and the absorbent vessels in animals, have precisely the same essential character with the membrane which constitutes the general surface of the sea-weed and red snow. Throughout the whole animated creation, the essential character of the organs which all possess in common remains the same; whilst the mode in which that character is manifested varies with the general plan upon which the being is constructed.

"In the early stages of formation in organised beings of the higher classes, before the structure has been progressively developed, we may observe as great a dissimilarity to its ultimate condition, as exists between the lower and higher classes. In the progress of developement we may trace a correspondence between the advance of the germ to maturity, and the ascent of the different races as they rise in their permanent condition in the scale of creation. The functions are more specialised, not so general; and there is a greater variety of dissimilar parts in the higher organisms than in the lower; the lower are more homogeneous, the higher more heterogeneous. A heterogeneous or special structure arises thus out of one more homogeneous or general, and this by a gradual change. When the different functions, however, are highly specialised, the general structure retains more or less the primitive homogeneity of function which originally characterised it. The doctrine of the correspondence between the transitory forms exhibited by the embryos of higher beings, and the permanent conditions of the lower, refers to individual organs alone, and not to the whole structure. The higher animals and vegetables can never be mistaken for those of the lower classes, though the progress of individual organs from a general to a special type is discernible in the developement of the embryo, as well as in the ascending scale. Eccentric developement explains the malformations from arrestment of developement in the higher animals, causing monstrosity. The study of monstrosities in the vegetable kingdom has been peculiarly effectual in the elucidation of the laws regulating the metamorphoses of organs, as the stamens or carpels reverting to the form of leaf, which may be regarded as the type of them all. In the labiate flowers the suppression of one stamen and the shortening of two others result merely from a deficiency in the evolution of rudiments, and not from alteration of structure; as is seen in the snapdragon having sometimes five stamens, and the petals all regularly spurred."

It is in the discovery of such general laws as those of developement noticed in this section, and of the functions in the following, that practice is greatly benefited by science. When we understand the methods in which the operations of nature are generally performed, we are often enabled to prevent adverse circumstances from being productive of so much harm, by retarding and preventing their effects; and, *vice versâ*, to promote and advance the action of those circumstances that are beneficial. When we can understand the different functions that the different parts of plants perform, and how and where these functions are developed, we shall have obtained a knowledge which, when joined to a proper understanding of the action of the stimulating agents formerly treated of, and of the way in which the food of plants assists in developement, will enable us to proceed on correct principles. Much no doubt remains to be done, but much has already been accomplished; and it is the duty of all practical cultivators to endeavour to understand that much. Did not science teach us, in its first rudiments, that the spongioles at the extremities of the roots were the true absorbent vessels, the manure might be applied to the stock of the root and become injurious rather than beneficial. As the absorbent vessels in animals are placed in contact with the alimentary canal, so do we find those of plants in contact with the soil, which acts as the stomach for the reception and preparation of their food. Liebig characterises the act of digestion in animals as being principally one of solution, the gastric juice (containing muriatic acid, and the substance similar to diastase, formed from the inner membrane of the stomach), with the oxygen of the saliva, and the heat and action of the stomach, reducing the food into a soluble state; in the same way as the action of the air, joined to the heat and moisture of the soil, reduces the substances deposited as food into a state fit for absorption. Digestion has been said to take place in the leaves; had this been the case, however, it would have reversed the normal order of developement, and the above remarks of Liebig restore the order of developement to its normal condition. Digestion being only a preparation for absorption, and not a chemical action, which he distinctly says it is not, prevents the necessity of reversing the order of developement, and placing digestion subsequent to, in place of before, absorption. The aeration of the circulating fluid is the principal characteristic by which the action of leaves can be compared to that of animals; the circulation of the fluid being produced by the power of endosmose and contractility on the ascending sap, and that of contractility, gravity, and endosmose on the descending. Digestion appears no part of their action, the absorption of light appearing only an assistant in the much greater chemical action required by plants than animals. The action of plants consisting in the preparation of ternary compounds, as gum, sugar, starch, lignin, &c., and quaternary compounds, as fibrine, albumen, casein, &c., from binary compounds, as water, carbonic acid, ammonia, &c., necessarily implies more chemical action than that of animals, whose food is principally in an organised state, already fit for assimilation, or at least identical in composition with most of the animal tissues, unless the nervous, &c. The decomposition of carbonic acid, water, and ammonia into their elements, and their recombination in a state fit for assimilation by the different organs, require a very great degree of chemical power; and hence full exposure to the direct heat and light of the sun is necessary to plants, to assist the organic action of the leaves in producing these results.

The vital force, Liebig says, is not needed so much in plants as in animals, for the preservation of the tissues from oxygenation; the non-azotised portions of the tissue may be reckoned as comparatively destitute of susceptibility to oxidation, when compared with the azotised portions: hence, he says, the vital force of plants is principally expended in the preparation of new matter, and not wasted as in animals by voluntary and involuntary motions and preservation of tissues; there is therefore more available vital force, and plants are more capable of augmentation in bulk and of forming new matter. He likens vital force, in its developement (not in its character, which he says is distinct), to that of galvanism; as the action of the zinc and acid produces, when in action, a force which may be collected and transmitted along iron rods, so is vital force generated, he says, from oxygenation, and preserved to assist in voluntary and involuntary motion, being transmitted along the nerves to where it is needed. It has not been customary to talk of vital force as a determinate quantity, increasing from the want of motion in one quarter, and being transmitted to another where motion is needed; but the explanation is plausible: the less waste and motion in plants may accumulate vital force, and the almost indefinite capability of extent in plants, as compared with animals, is well known to all practical men, whether it may flow from accumulated vitality or whatever cause. Müller says: "Plants, having only one mode of manifesting life, namely, by vegetation, do not require manifold organs in addition to their roots, stem, and leaves; and, with the exception of the organs of fructification, transformed from leaves in some cases, present merely a repetition of similar parts, in all of which the simple relation of branches to leaves is the same. A consequence of this is, that each of these parts has the power of becoming in its turn an independent living body; the seed differing from the shoot only in its greater vegetative power." Respiration, he says, affords a very important distinctive character between animals and plants; being performed in plants by the whole surface, and in animals confined to an organ which, in a small space, affords an immense surface for contact with the atmosphere. The difference, however, is more structural than functional: plants give off, or expire, carbonic acid constantly, the same as animals do, though not in so great a quantity; the inhalation of oxygen and exhalation of carbonic acid form a constant function, and seem necessary to their existence. The whole surface, in the dark parts, is said to be capable of this function in some degree, but in the higher classes of plants it is principally confined to the leaves; and the surface of animals is said not to be wholly destitute of this power, even in the more perfect. It is in the inhalation of carbonic acid by the green parts of leaves, and the exhalation of oxygen, that plants differ most from animals. This function is totally different from any thing to be found in animals: it has been called digestion, but seems totally different; and would appear rather a distinct process, necessary to plants only from the greater chemical action required to prepare organised products from inorganic substances. The heat and light of the sunbeam being necessary to perfect the great organic chemical action required, the organs adapted to this function require to be developed externally.

The *most remarkable similarity* subsists between plants and animals, Müller says, in the process of the *developement of their tissues.* " The observations of Mirbel had shown that all the forms of vegetable tissue are developed from cells, which at first constitute the whole mass of the tissue, but afterwards undergo various changes in their shape and size, so as to be converted into woody fibre, spiral vessels, &c. M. Schleiden has more recently traced the developement of the vegetable tissue at a still earlier stage. The abundant gum of nascent parts of plants, such as the youngest albumen of a seed, when examined by the microscope, is seen to be turbid from the presence of minute molecules: soon larger granules are also observed in it; around these granules, by a kind of coagulation, larger bodies are formed, the *cytoblasts,* in which the above-mentioned granules are still visible as nuclei. When the cytoblast has attained its full size, a small vesicle appears on it; this enlarges and becomes the cell, in which the cytoblast is for a period still visible, either attached to its wall or free in its cavity, sometimes permanent. From the observations of animal physiologists, and particularly of Schwann, the process of developement and growth of the tissues of animals are exactly the same. Nearly all the tissues have been shown to be formed from nucleated cells, previously developed in a homogeneous formative mass. The order of developement of the cell and its nucleus or cytoblast, and secondary nuclei within this, as far as it has been observed, appears also to be the same in animals as in plants. Some of the tissues of animals, like the cellular tissue of plants, retain the cellular form, while others, like the more highly developed vegetable tissues, assume different forms." In the growth of marchantia, Mirbel discovered that they increased by the production of new cells alternately between every two of the old; new rows of cells are thus formed, and they extend laterally by additions outside, as well as by superimposed rows. The woody fibres pass downwards from the leaves through the cellular tissue, leaving openings of cellular matter in exogenous plants at the medullary rays, which connect the interior and exterior of the stem. The woody and cellular matter forming the basis of the vegetable structure are thus developed. While the tissue is young and succulent it expands and stretches freely, according to the heat and moisture supplied; and, from the power of endosmose, produced by the light and heat acting from above, thickening the sap by evaporation and chemical action, and attracting the thinner fluid upwards, the expansion is principally in a longitudinal direction upwards, till the leaves are fully formed and commence to solidify and ripen the branch, by the elaborated sap sent downwards. Some plants make the whole of their shoot at once in the early part of the season, others have a spring and autumn growth, and some continue extending the whole season round.

Thus far observation has conduced to establish the theory of developement. We are thus taught that to encourage the soil, the stomach of a plant, to perform its functions, the soil must be properly pulverised in dry weather, as I have often elsewhere repeated in other essays. Too little regard is had to the mechanical operation of the pulverisation of the soil, and taking advantage of tids of weather; and too little allowance is given for unforeseen adverse occurrences of weather and soil, in the experiments instituted in various quarters on manures. To practical men, it is well known that the state of the soil has often more effect on growth than the food deposited; if the stomach of an animal does not perform its functions properly, it will be in vain to load it with food. The function of absorption is increased by keeping the soil loose and porous, to enable the roots to spread and ramify, which is also greatly encouraged by porous substances in the soil, as pieces of charcoal, bones, decaying wood, porous stones, &c. One of the best materials for encouraging the formation of fibres is rotted leaves, or the charcoal from the half-smothered combustion of the spray of young shoots, leaves, &c.: the leaves and young shoots contain all the substances necessary for keeping vitality active; if the heat is violent it may dissipate the ammonia and fibrine of the shoots, and do harm. The light and heat of the sunbeam are also necessary to produce the phenomena of endosmose, without which absorption and circulation could not go on; electricity also will probably assist in the vital activity or irritability of the tissue, which increases circulation and absorption. To assist aeration, heat and light are necessary to produce exhalation; to promote the interchange of gases, it is necessary that the leaves be kept free of dust and extraneous matter; and when the state of weather out of doors, or confinement in houses, has clogged the leaves, the lungs of plants, it is absolutely necessary to syringe and keep them clean. The important organic chemical action of the leaves, so necessary to prepare the food for assimilation, is also promoted by the same means. Into the functions of the preparation of the food (or digestion), absorption, circulation, and aeration, science has thus enabled us to obtain so much insight as greatly to facilitate and augment their action by proper cultivation. When I come to treat of each of these functions in a special manner, the subject will be rendered more intelligible than it could be in a general outline.

Of the remaining functions of assimilation, secretion, and reproduction, we are more ignorant; of that mysterious power, which from the simple membrane of the organs (to all microscopical and chemical observations seeming alike) can elicit so many and such varied products, we are completely ignorant. Chemical observation of the secreted products, however, and analysis of particular plants, enable us to know what food it is necessary to provide for each; immense additions have lately been, and are still being, made by chemists to our information on these subjects, and great benefit should redound to practice therefrom. Of the same mysterious vital power, which from the rudiments of a branch can prepare such seemingly different products as the parts of the flower, and can change the reproductive bud into the more perfect though more changeable organ the seed, we know also comparatively little. Observation, however, has established that a duly elaborated state of the food is essential; and that where light and heat, or the influence of the sunbeam, cannot be got in sufficient quantity, we can assist the operations of nature by lessening the quantity of sap to be elaborated, and produce the necessary elaborated state for fructification from a small quantity, which our insufficient means will not enable us to do from a larger. By retarding nutrition we thus increase the tendency to reproduction; and, *vice versâ*, by picking off flower buds, and increasing food, we increase the tendency to nutritive growth.

Of the manner in which roots, buds, and shoots are produced we know but little in a general way, unless that accumulations of matter, especially vascular, favour their production. It is generally stated by physiologists, that a single cell, in a proper situation and under proper circumstances, is all that is necessary for the preparation of a bud, the nucleus of all growth. Some have thought them connected with the medulla: Mr. Knight thought they were from the alburnum. Masses of buds, however, may be seen in many cases generated in enormous quantities, and crowded together without normal order, from extravasations of sap, on all parts of a plant.

Of that mysterious power which guides the development of the plant, evolving the different organs according to the normal manner of the different species, few have attempted to give any definition. As I noticed before, Müller has likened it to an idea, a picture of the imagination, to which the actions of vitality are constrained to conform, thus causing them to develope after a normal manner, and produce each being after its own kind from the picture. When alterations are made by hybridisation, &c., the picture we can imagine to be conformably altered, and we might thus construct a plausible theory; the great difficulty, however, is to imagine the seat of the sensorium where such picture could be formed. Bonnet and other Continental writers have adopted a different opinion, and contend that all the parts of a plant are contained in embryo in the original germ; and that the actions of vitality only cause a developement of previously formed parts, and not a formation of new. Mr. Main, in this country, has been the principal advocate of these opinions. A membrane or indusium, visible or invisible, he says, always surrounds the germ, which contains all the organs of the future plant; all the parts of the plant are afterwards developed from this indusium, in which they are contained, he says, in embryo, and developed as the membrane expands; and it throws off every year a new layer of liber and alburnum, in exogenous plants. As I before noticed, however, if every thing is contained in embryo previously to being produced, it does not account for accidental interference of hybridisation, or adventitious buds; nor does it allow for leaves and flowers being mutually transformable. It, however, gives a tangible shape to our ideas, by allowing us to conceive of what is invisible, by referring it to something we are already acquainted with; as we conceive of a spirit having bodily organs, though we are only assisting the imagination to comprehend, and are entirely ignorant whether we are right or wrong. If such a thing as an indusium, or germinal membrane capable of such extension, really exists, it ought not to be confined in its operations by an already full and perfect formation of parts, but should have only the rudiments of organs, in a plastic condition, capable of transformation. The tendency of the cambium, and all semiorganised matter, to throw off a membrane when exposed, would seem to countenance such an opinion, though it may only be an effort of vitality to cover the exposed parts with a skin. In the *Gardener's Chronicle*, some time back, it was noticed, on the authority of accounts from Egypt, that in some situations it had been found possible, by slicing and uniting seeds of nearly allied species of the genus *C*ìtrus, &c., to produce plants which, in their developement, partook of the nature of the different species united. The most curious case of developement that has come under my own observation is that of the *C*ӯtisus Adàm*i*, or purple laburnum. It has been said by some to have been produced from the union of the two barks of the bud of a *C*ӯtisus purpùrea, inserted in a stock of the common laburnum, and to be the product of an adventitious bud developed where the two barks unite; by others it is said to be a true hybrid from seed. The flowers are generally of a greyish purple colour, the leaf and habit of growth resembling the common laburnum. Some of the branches have been found to sport off to the common laburnum with yellow flowers; but the most unaccountable circumstance is, that some plants which were for some time grafted and pruned, and had the ordinary strong growth and foliage of the laburnum, have, at the place where ordinary branches had been pruned off, been found to develope shoots of the true *C*ӯtisus purpùrea, which is so strikingly different in habit and foliage from the laburnum. A union of indusiums would best account for the accidental protrusion of parents*, though it might puzzle us to account for the manner in which they could be united in the purple laburnum, so as to affect the colour of the blossom only. The alteration of the pictures of the imagination, or idea of the living principle (of Müller), might be supposed more capable of change, and to embrace a wider range of variations. To talk, however, of things we have no means of demonstrating is apt to bewilder, and lead us away from the truth. The doctrine of preformation of parts is, to a certain extent, undoubtedly correct, as any one may see for himself by dissecting buds, bulbs, &c.; beyond this, however, we have no correct data to go by. The habit or manner of growth of trees belongs also to developement, and when we see round-headed trees change to fastigiate forms, from no cause we can perceive, as in the Exeter elm, &c., it might puzzle us to say whether it was a change of indusiums or pictures. The training of standard fruit trees in the form of inverted umbrellas, &c., is surely an improper violation of natural developement.

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* The two parents (*C*ӯtisus Labúrnum and *C.* purpùrea, which form *C.* Adàm*i*) are found at times to protrude from branches of *C.* Adàm*i*, as if not completely united, but only held in mixture.

In Chap. IV., *On the general View of the Functions of animated Beings, and their mutual Relations.* "In order to arrive at any certain general conclusions, the physiologist must collect and compare all the facts of similar character which the study of animated creation furnishes. From the simple cellular plants we should obtain very vague ideas of the character of the nutritive processes, as we cannot separate them, and investigate them apart; and, on the other hand, we should form very erroneous ideas of the essential conditions of these processes, to study them only in their most complex form and specialised condition. It is only from a comprehensive survey of the whole organised creation, embracing each extremity of the scale, that laws possessing a claim to general application can be deduced. The essential part of the function of respiration is, the aeration of the blood by an interchange of ingredients between the circulating fluid and the air, from the exposure to the atmosphere, or to water holding air diffused. The alterations in the capacity of the chest, which are effected by the actions of the diaphragm and external muscles, only serve to renew the quantity of air in contact with the membrane of the lungs which expose the blood to it. They have no share in the aeration of the blood, except by supplying its conditions. If these could be supplied independently of them, the essential part of the function would be performed as well as with them. In all of the functions, some of the changes are essential, and some superadded. Reptiles, having no diaphragm, fill the lungs by a process resembling swallowing. In fishes the blood is sent to meet the water, which is in apposition with the external surface. In the lower animals a change of water is supplied by their moving from place to place; or, when fixed to a particular spot, by means they possess of creating currents, or vortices, by ciliæ, to draw to them a supply of food. In plants the essential part of the function is performed without any movement whatever, the wide extension of the surface in contact with the atmosphere affording all the requisite facility for the aeration of the circulating fluid.

"In all living beings, the appropriation of alimentary materials from without, their conversion into a nutritious fluid to supply materials for the growth and renovation of the fabric, and the excretion of unfit particles, constitute the sum of the vital acts by which the individual is supported. The maintenance of individual life, however, is not all that is required; all organised structures must be produced by others previously existing, no living being ever taking its origin in spontaneous combinations of inorganic matter. Since the limited existence of each individual would soon occasion the extinction of the race, were no provision made for perpetuating it, each organism has been endowed with the means of preparing a germ which, when mature, may support an independent existence, execute all the vital changes, and in its turn originate new beings by a similar process. This function, common to all living beings, is termed *reproduction.* There is a certain degree of antagonism between the nutritive and reproductive functions. The materials of the reproductive are derived from the nutritive, and dependent on it. Where the nutritive functions are particularly active, as in algæ, the reproductive is correspondingly undeveloped; and, *vice versâ,* in fungi the whole plant seems made up of reproductive organs, and ceases to exist when the germs are brought to maturity. The parts of the flower are converted into leaves by an over-supply of nutriment; and the gardener who wishes to render a tree more productive is obliged to limit the supply of food by trenching round the roots. The same antagonism may be witnessed in the animal kingdom. During the period of rapid growth, when the energies of the system are concentrated upon the perfection of its individual structure, the reproductive system remains dormant, and is not aroused until the comparative inactivity of the nutritive functions allows it to be exercised without injury to them. The insect, in the larva condition, is wholly occupied with the assimilation of food and increase of bulk. The same is the case, more or less, with all young animals. In the imago, or perfect insect, the fulfilment of the purposes of its reproductive system appears to be the chief and only end of its being. In the adult condition of the higher animals, it is always found that, as in plants, an excessive activity of the nutritive function indisposes the system to the performance of the reproductive; a moderately fed population multiplying more rapidly than one habituated to a plethoric condition.

" The *absorption* of alimentary materials is the first in the train of vital operations, and is common to plants and animals, though somewhat differently performed in the two kingdoms. The alimentary materials taken up by the absorbent system are carried by the *circulation* into all parts of the fabric. This movement is more necessary in the higher classes than in the lower, where the absorbent surface is in more immediate relation with the parts to be supplied. In animals, as in plants, this function is entirely independent of the will, and in health unaccompanied with consciousness. The muscular apparatus is concerned in it only to harmonise it with the conditions of animal existence; and nervous agency merely brings it into sympathy with other operations of the corporeal and mental system. Besides conveying to the various tissues the materials required for their renovation, the current of circulating fluid takes up, in animals especially, the particles which have discharged their duty in the structure, and which are either to be rendered again subservient to the process of nutrition, by admixture with alimentary matter newly absorbed, or to be separated from the general mass, and carried out of the system. This function is termed *interstitial absorption*, and is performed, in the higher animals, by a special vascular apparatus. The alimentary materials undergo various changes before becoming part of the organised fabric, which are difficult to trace. The first perceptible change is, the formation of *organisable products* by a new combination of the elements supplied by the food. This appears to commence, in vegetables, as soon as these elements are absorbed; and the same may probably be said of animals, though the preparatory process of digestion seems to partake of it. The organisation of these products appears to commence in the circulating fluid. The elaborated sap of plants, and the chyle and blood of animals, contain these organisable products in abundance (not merely mixed); and the existence of regular globules in them results from incipient organisation, a characteristic of nutritious fluids. From these materials the individual tissues of the fabric are created and renewed by the process of *nutrition* (or *assimilation*); each deriving from the blood that portion which its composition requires. To preserve the circulating fluid in the state required for performing its functions, means are provided for elaborating certain fluids having a destined use in the economy, and for separating and carrying out whatever may be superfluous. These are termed *secretion* generally, the latter *excretion*. In proportion to the complexity of the structure, we find the excreting organs multiplied, and their products varied, this function being no less important than absorption. The loss of fluid by *exhalation*, and of superfluous carbon by *expiration* (a kind of excretion), is constant in all living beings."

The views above stated of Dr. Carpenter on reproduction, or generation, differ from those of other physiologists. It has been customary to state that it is produced by excess in the nutritive system. Liebig, on the same subject in animals, takes this view, and notices the power of accumulating nutritious matter, at certain periods, as proofs of this. The accumulation, however, may be the effect and not the cause, a provision, not an inducement; the case of insects, which are destitute of this power while the nutritive functions are most active, would seem to infer as much. It is perhaps, however, not so certain that a comparative cessation of the one should take place before the other commences. Over-fed plethoric beings cannot be said to possess the nutritive function in a higher degree than moderately fed ones that are more healthy. Precocity may be induced by starvation, but not fertility. The reproductive function is undoubtedly antagonist to the nutritive, but it is also dependent on it; and fruitfulness is, perhaps, greatest in animals when the nutritive function is at full maturity, and before it declines. In plants the contrary would appear to be the case, as unhealthy stunted plants are most precocious. In such, however, the function is never performed with the same vigour, nor are the seedling plants from these ever so healthy and strong.* In annual plants, such as grain crops, the quantity and quality of the seeds increase, generally, as the vigour of the nutritive function is induced, though it may be carried to excess there also; yet in these there seems a period of maturity similar to that in animals. In trees a cessation of the vigour of the nutritive function does indeed seem necessary to produce reproduction: it is not till the tree has extended itself, and until, by the slowness of the more impeded circulation, shorter and less vigorous branches are produced, that the period of fruitfulness commences. This period may be hastened also by starving the tree, and may be protracted by over-feeding; as in animals, so also in plants, plethora may be produced and death. Plants, however, differ from animals in being a congregation of individual buds, each of which is capable of maintaining a separate existence, and, under certain circumstances, of becoming seed. The most essential of these circumstances seems to be, the quality of the food: to produce that quality the elaboration of the leaf is necessary; and, to produce the necessary elaboration, the stimulating and chemical power of the sunbeam is essential. Were we able to produce the latter at will, we would not be so apt to err in giving too much food; but, as it is not at our command, we are necessitated to produce the necessary quality of the food, by providing a smaller quantity to be elaborated. It is well known to practical men that this is the case. Most of our vegetable physiologists, however, contend that it is the quantity of nourishment that produces fruitfulness. Mr. Knight took this view of the subject. It is well known that taking a ring of bark from the branch of a fruit tree induces fruitfulness in that branch, and this would seem to be brought about by the less quantity of sap furnished to the branch. Mr. Knight, however, supposed it to be owing to the accumulation of the descending sap at the upper lip of the ring, as he found the wood always of more specific gravity above than below the ring. This was probably, however, owing to the less expansion by growth above than below causing less wood, and of more specific gravity. It is not at all probable that more sap would be conveyed to a ringed than an unringed branch; and the truth of less sap producing fruitfulness is undoubted, from dry poor soils producing fruitfulness much sooner than rich moist soils, and the lopping off of large roots having the same effect. The healthy strong-growing plant in which the nutritive function is in full vigour, not plethoric, produces, however, always the best fruit, though not the greatest quantity of it: the seeds also from such trees will furnish the most healthy strong seedlings; and perhaps the furnishing of a limited supply of food, and depressing the vigour of the nutritive system, are more productive of precocity than real fruitfulness. The two functions are undoubtedly in so far antagonist, that the one can only subsist at the expense of the other; but this would rather seem to imply a necessity of vigour in the nutritive to supply the wants of the other. Plethora depresses the vigour of the nutritive function, and, in animals at least, may weaken by excessive stimuli as well as disease. Plants possess a corrective to plethora in the extension of the system, which is not possessed by animals. There are no determinate limits to their extension: and the addition of new shoots and branches is a means of getting rid of excess in the quantity of food, which must tend to make the plethoric state less frequent, and make amends for the want of a sensitive appetite to determine the quantity absorbed. Trees that are found plethoric and apt to canker in cold wet seasons, become again sound when warm congenial seasons ensue; much is therefore owing to want of heat and light, to which there is also a corrective in the diminished quantity of endosmose absorption occasioned by their absence. When so many causes are at work, it requires great skill and consideration in the operative to apply the necessary correctives, at the proper times, and in the proper manner; and, after all, his efforts may be baffled by unforeseen and unexpected alterations of the weather.

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* Too little attention has been paid to this. Were the seeds of trees collected only from vigorous young plants in place of stunted ones, which have most seed, the young trees would be found to have a more vigorous habit, and produce more wood.

I have before noticed that when we consider the soil as the stomach of the plant, in which the food is digested by a process of solution similar to that in the stomach of animals, the manner of performing the next function, absorption, seems to differ little in character in plants from that of animals. The function of circulation appears undoubtedly to be more under the power of vital contractile force in animals, and to be more under the influence of external agents in plants. Though the power of endosmose, said to be the principal cause of circulation in plants, does not seem much dependent on vitality, and rather depends on heat and light for a continuation of its action, it is the opinion of the best of vegetable physiologists, that this power will not account for the whole force of the circulation, though commencing it and being a great assistant; and the force both of the descending and ascending current, they ascribe greatly to the vital contractile power of the vessels through and among which the sap moves. This opinion is likely to be correct, and it likewise tends to produce more similarity in character between the functions of circulation in plants and animals.

Liebig and others seem to be of opinion that the particles which have discharged their duty in the structure, and are taken up as waste by the oxygen inhaled, cannot be again rendered subservient to the process of nutrition in the same system; and if this opinion is correct, if all the waste carbon must be secreted, this would argue the necessity for interstitial absorption in plants as well as animals. DeCandolle and others seem to be of opinion that the carbonic acid formed in this process may be again decomposed in the leaf, and the nascent carbon be again employed in nutrition. On such a subject there would seem little probability of being able to make decisive experiments; it is more natural, however, to suppose that the effete or worn out particles should be rejected and excreted.

It is a very general opinion, that chemical changes are begun to be produced in the food so soon as it enters the system of the plant; and this has been said to be corroborated by the augmented proportion of the organisable products found in the sap as it ascends the tree. It is uncertain, however, how much of these is derived from the deposits of starch, sugar, &c., stored up in the alburnum, &c., the previous season, to serve for nourishment to the young shoots at the commencement of the growing season; and undoubtedly the principal action takes place in the leaves; it is there principally that the food is prepared for assimilation. From the ramifications of the vascular system, however, supplying the air found in them, it is probable that aeration and interchange of gases may take place, to a certain extent, through the whole of the system of the plant; an organic action may also be exerted by the membranes of the cells which the fluids pass through. Some are also of opinion that the sap possesses vital properties, and may itself exert an action on the substances imbibed from the soil; this may be either in the manner denominated catalytic by Berzelius, in which substances produce chemical changes without being themselves changed, or it may be vital power inherent in the sap or blood. The nitrogenous excretions from the spongioles probably assist in dissolving the food in the soil, acting like diastase.

(*To be continued.*)

Erratum. — In the May Number, p. 192., line 15., for "animal" read "mineral."

ART. II. *On the Food of Plants, and its Transformation.* By ALEXANDER FORSYTH.

THERE is certainly nothing so essentially necessary for a gardener to be acquainted with, as the nature of the materials of which vegetables are built; for, whether he thinks it or not, the multiplying of vegetable tissue is a far greater and more difficult task to perform than the after-management of it.

Dr. Lindley tells us, in his *Introduction to Botany*, p. 1., that "the chemical basis of the elementary organs has been found to be oxygen, hydrogen, and carbon, with occasionally a little nitrogen or azote, combined in various proportions." All this may be very true: yet, with all humility, I would beg leave to remind those who rely implicitly on the chemist's word for the analysis of any living thing, that to resolve any thing, animate or inanimate, that God has made, into its simple elements or component parts, is, to say the least of it, a very delicate task; for the boiling of one thing into gas, or the burning of another thing into a cinder, to tell their natures by applying tests to the produce of what the element fire has made to fly off from the one on approaching it, and what it has left in passing over the other, can give but a very vague idea of the real and original nature of the thing itself. However, I shall have a host against me of great and learned men, with hard names and tales of tests that they have tried, which prove their verdicts to be very truth; and that for the like of me, a mere gardener, and not even understanding gardening in all its branches, to begin to question the correctness of what "*has been found*" in chemistry, is only one more example of the vulgar errors that ignorant men are always stumbling into: yet, be this as it may, I only pretend, in the humblest and clearest way I can, to give an opinion on the workings of nature in the construction of the vegetable kingdom.

Scarcely any thing can enter into the composition of a vegetable that is not aeriform. The dung, lime, earth, and water, that grass grows out of, are far from being in the grass in a gross state, for the tissue of which the grass is built bears more resemblance to water than to any of the other media from which it arose: but what is water?—only a mixture of gases of such a nature that if a little more of one gas were in it, and a little less of another, it would be so unlike water that it would explode like a cannon, and go flaming far off into some new form. This is no idea of mine; therefore I am not to be accountable for its accuracy: it is part of the memorandums I made from a lecture by Professor Hemming (of the Marylebone Institution), at the Hall of the Mechanics Institute, Brentford, where he decomposed water into hydrogen and oxygen, and proved these gases to be real by testing them with fire.

Now, supposing this correct, or nearly so, and supposing Dr. Lindley's theory correct of the gases of which vegetables are composed, we come to the delicate point of how these gases are transformed into the living forms in which they appear in every green thing: and, leaving out the unprofitable search after the principle of life, and not attempting to settle the disputed point as to whether tissue begets tissue, as some have said, I will examine the media in which tissue is formed, and as these media are more or less within our control, we are likely enough to be rewarded for our pains in examining this matter; for I strongly suspect that this is the root of gardening, and that the delving deep into the soil, and turning the lower layer up, and the top layer down, confer benefits upon vegetation that have not been dreamed of, for the following reasons. Suppose a new vine border made of turfy loam, bone manure, &c. &c., well drained to carry off water, and eke admit air, whether foul gas or clean pure air no matter; there must be air, and that in great quantities, in the border and under the border. Now, what becomes of this air so confined? I mean that which lies in the cavities in the soil. I shall suppose a cubic foot of the vine border to contain about the bulk of a brick of good dung, such as a mixture of animal dung, bones, grassy turf, &c., and about the bulk of two bricks of air, the rest being common garden earth. Now, if these materials, that is to say, the manures, were in the bottom of a bottle, and a sort of loose stopper put in the bottle, such as a tuft of straw, and this manure occasionally well wetted with rain water, and well warmed with summer heat, there would unquestionably be formed a gas of some strength, and of such a penetrating kind, that if any medium, such as a bit of sponge, a piece of porous brick or sandstone were placed in its atmosphere, it would soon be charged with the gas in various forms, as to fineness and intensity; and, from what I have observed, it is in this gaseous air that the vegetable extends, and where the gas is not there the spongioles extend not. For example, if you lay a turf on a border, you will draw the roots near the top, or if you lay a stone or a tile, you will find the roots right under it; but if you loosen the soil in such a way that wind can get in and gas out, you will look in vain for roots extending their feeders into that medium. I am therefore strongly inclined to suspect that this is the food of the tissue of which plants are built, and that the more of this gas is secreted in the soil or media in which roots are placed, the more quickly will they extend and multiply tissue: and such seems to be the nature of the sap, that it is stored in small bags or bladders, and in this form it lines and covers and overlays all the more essential parts, in the same way as the white of an egg surrounds the yolk, until like that it becomes assimilated with the substance that it first fed and protected; and, as if it required a separate chemical laboratory to complete its grand design, as soon as it passes the collar of the stem, and visits upper air, it takes other properties, as the tadpole takes to lungs and legs, and hops the meadow, that erewhile was, like a fish, perfect to live and move in water.

Thus the grubs and worms, that seem only slightly removed in the scale of existence from the substance on which they feed, are only as it were prepared victuals for a higher order of more perfect animals, such as birds, &c. But what could be more to the purpose, in the present argument, than the transformation of insects? The gluttonous grub fattens upon rude simples, as leaves and crude fare, yet secretes in this filthy carcass the materials of a beautiful fly. Now, what nonsense would it not be, to say this fly is only a modification of gooseberry leaves? for on that alone the grub fed from which this grew. Hence I reason, that in plants there is certainly a great deal of transformation in the secretions they store up: thus, the ball of a turnip is a storehouse for the feeding of the flower stem; therefore the highly elaborated sap of the ball of the turnip changes its nature and consistency and flows into the flower stem, leaving the ball a mere open sponge. Now this ball of the turnip is an illustration, however clumsy, of the laws that I suspect regulate the formation of the vegetable tissue. The little bladders full of vegetable sap, pure white, are only, if I may use the expression, the atmosphere or surrounding medium in which the more highly elaborated parts are formed and fed, or, in other words, the grub of the future flower; for example, the well dug ground in summer, and well manured, must be more or less impregnated with certain gases. In this medium the seed of a plant is placed, and a change must take place; for the dry and thirsty husk of the seed, like the sponge in the bottle, gets a share of all the gases that are in the earth and water around it, and begins to develope, swelling its bags with sap more or less elaborated by its cotyledons; and, having the power, that is everywhere so evident in the works of the Creator, to work out its own perfection, it first elaborates the gases around it into bladders of sap seemingly tasteless, colourless, and so exceedingly delicate that their formation under these circumstances seems a miracle. Into these bladders the more elaborate parts of the plant penetrate and feed: thus a growing tree, or a growing grain of mustard seed, must not, cannot, stand still. Like as in the beautiful frond-like appearances that are beheld on the glass of a window on a frosty morning, or on a piece of water, the imperceptible particles keep adding to the extremity of every branch, extending its sphere, so it is with the spongioles or feeders of roots in a living growing plant.

When sap is secreted in the earth, the canals of the plant convey it above the collar; here another set of organs begin to elaborate it still higher: like the tadpole with liver and legs, it is now at work in upper air, and acts towards the attainment of a higher end in the same manner as the grovelling grass grub after a time; and, under the action of certain external influences, as warmth, &c., brings forth, or rather becomes, a being so very different from what it once was, that no one could have ever dreamed the transformation possible.

Below the collar of the plant, therefore, the sap, being only one stage removed from the crude elements that surround it, is exceedingly imperfect; and it is only in the simpler forms of vegetable life that cuttings from the root will produce perfect trees. The sap in the trunk or stem of a plant above the collar seems to be a little more refined, and, consequently, reproduces its kind by cuttings or truncheons more readily than the root does; for there is evidence enough to show that the old bark on the stem is far from neutral in the economy of the plant. Thus the young roots, thick, short, and manifold, that protrude from the stem of a vine when it is growing in a confined shady vinery, where the atmosphere resembles the gaseous medium proper for roots, show that the outer bark, as well as the inner, felt the effects of the medium they inhabited, and turned it to account by forming tissue in it; whereas, had the atmosphere been, like fine summer weather, clear of shade and damp, and resembling that sort of air that is so favourable to electrical experiments, the bark of the stem would have had a different office to perform. But it is very evident that the leaves form the principal laboratory of the plant, for in their flat plates the sap must be acted upon intensely under a powerful sun; and when we consider the round form of trees and plants, and the angle in which the individual leaves hang with respect to the sun, we find that a tree exposes more superficial extent of leaf at right angles to the sun's rays than would be credited. From what I could calculate of a lime tree, it seemed to have a surface exposed to sun and wind (that is, counting both sides of the leaf,) of nearly an acre. On a branch of a chestnut tree about the length of my arm I counted 100 leaves; measuring one leaf, it averaged 6 in. by 2 in.; and counting both surfaces, it only required six leaves to the square foot. Thus on this twig there was in the 100 leaves a surface of more than 16 square feet; and estimating the tree to contain 1200 such twigs (and this is under the real number), there was little short of half an acre of surface lined with sap that must thicken by drying winds, and be almost baked by the direct rays of the sun acting on so thin a layer. The spray on which these leaves stand, and the buds in their bosoms, tell how highly refined, and how much more perfect, the sap now is; for not only are the buds and twigs better adapted to propagate from in the form of cuttings, but without the aid of man they have secreted the rudiments of flowers to reproduce their kind in numberless profusion: and it seems to take the energy of every organ in the whole tree for this end. Therefore, the future flower is not a modification of the bark, &c., as some have said, but a thrice-refined secretion elaborated by the combined forces of the whole tree, for the noble purpose of representing to future times the type that the fiat of the Creator first called forth; and though the petals of the flower may be coloured richly, for the attraction of insects to do the work of impregnation, yet there is reason to think that they have some important office in elaborating the finer secretions necessary for the seed.

But, having premised thus far, I must leave the application of this theory till a future day.

Alton Towers, Nov. 9. 1842.

(*To be continued.*)

ART. III. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the CONDUCTOR.

(*Continued from* p. 367.)

VI. DESIGN FOR A CEMETERY ON HILLY GROUND.

THE lithograph *fig.* 90. is an isometrical view of a cemetery, supposed to be situated on hilly ground, the use of which is to show that an uneven surface may be thrown into beds and borders for graves on the same general principles as in a cemetery having a flat surface. In this design, there are supposed to be two chapels included in one building, and entered through porticoes on opposite sides. The surface of the ground is supposed to rise considerably from the entrance lodge to the chapel, and to fall from the chapel to the north-east on one side, and the south-west on the other. If the reader will trace with his eye the direction of the main road from the lodge at *a*, till it returns to *b*, he will find that a view of the entire cemetery may be obtained from it, without going over any part twice; but, as it might be desirable, on account of the view, to descend along the road which leads to the chapel, as well as ascend, the branch road *c* is laid out, in order that after having entered at *a*, and returned by *b*, *c* might be entered; and, after proceeding as far as *d*, the visitor might return by the chapel, and come out where he first entered at *a*.

It will be observed that there is a border for graves immediately within the boundary wall, which a walk separates from another border. There are also broad borders to all the carriage roads; and the interior of the compartments formed by these borders is laid out in beds 18 ft. wide, separated by grass paths 3 ft. in width, as in the design for the Cambridge Cemetery.

At the four principal angles of the boundary wall are enclosed yards, in each of which there is a shed for tools, planks, grave-boards, and other necessary implements and articles.

On the outside of the entrance gates are shown one of Shillibeer's two-horse hearses arriving, and one of his one-horse hearses screwed up, so as to resemble a common mourning-coach, returning. At *e*, in the interior, is shown a funeral with a truck-hearse; and, at *f*, one with a hand-bier.

The great extent of the borders in this cemetery renders it particularly eligible for being planted as an arboretum.

VII. THE PRESENT STATE OF THE LONDON CEMETERIES, CONSIDERED CHIEFLY AS CEMETERY GARDENS.

FROM the discussions in the preceding pages, the reader will have anticipated much of what is contained in the present article, in which, indeed, we shall chiefly recapitulate what has been stated before more in detail. Of the eight cemeteries which have been formed within the last ten or twelve years we shall not single out any one by name, but notice chiefly objections which apply more or less to all of them.

We object to interments made in catacombs above ground, and to all interments in catacombs, however situated, in which the cell is not hermetically sealed (instead of placing an open grating before it), the joints within being previously covered with a thick coating of cement. In the last-formed cemetery the catacombs are not yet built; but, in all the others, so great an expense has been incurred in the catacomb department, that it must operate as a serious drawback to the profits of the shareholders. As far as we have been able to ascertain, interment in catacombs is on the decline, as well in the

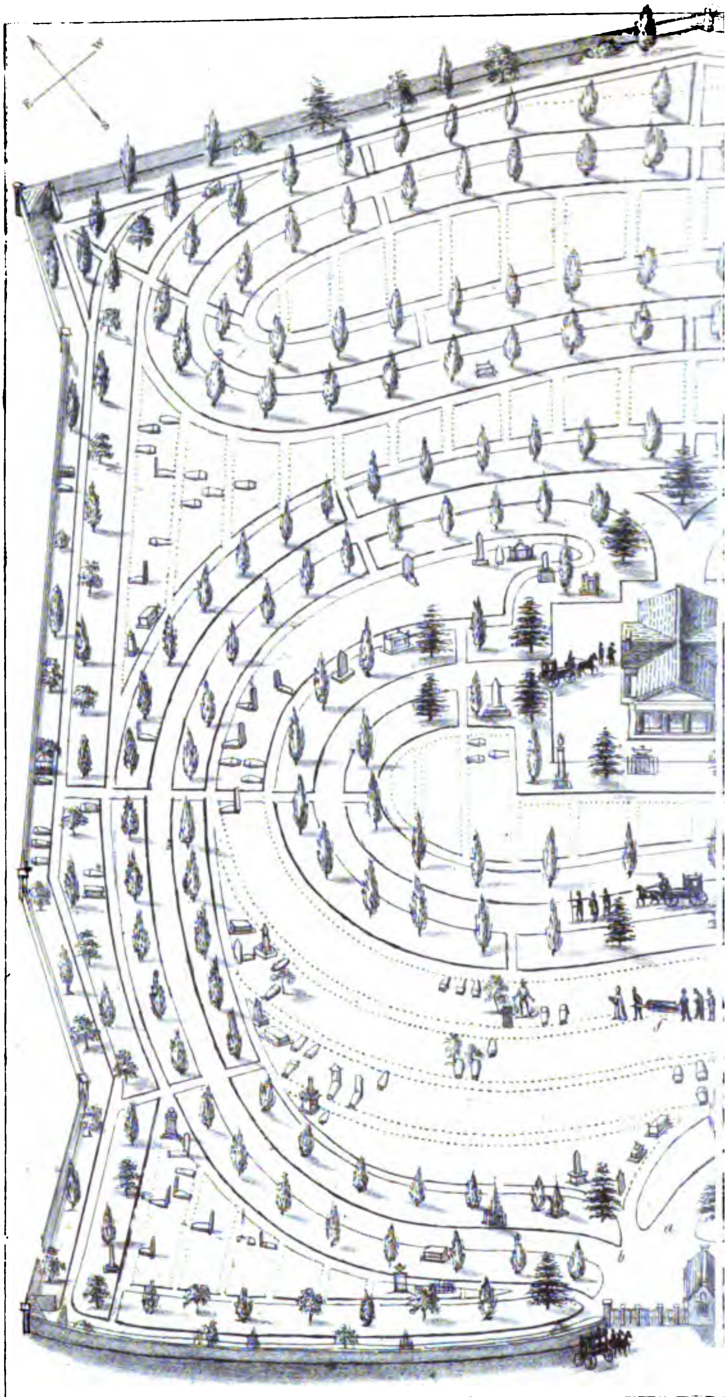
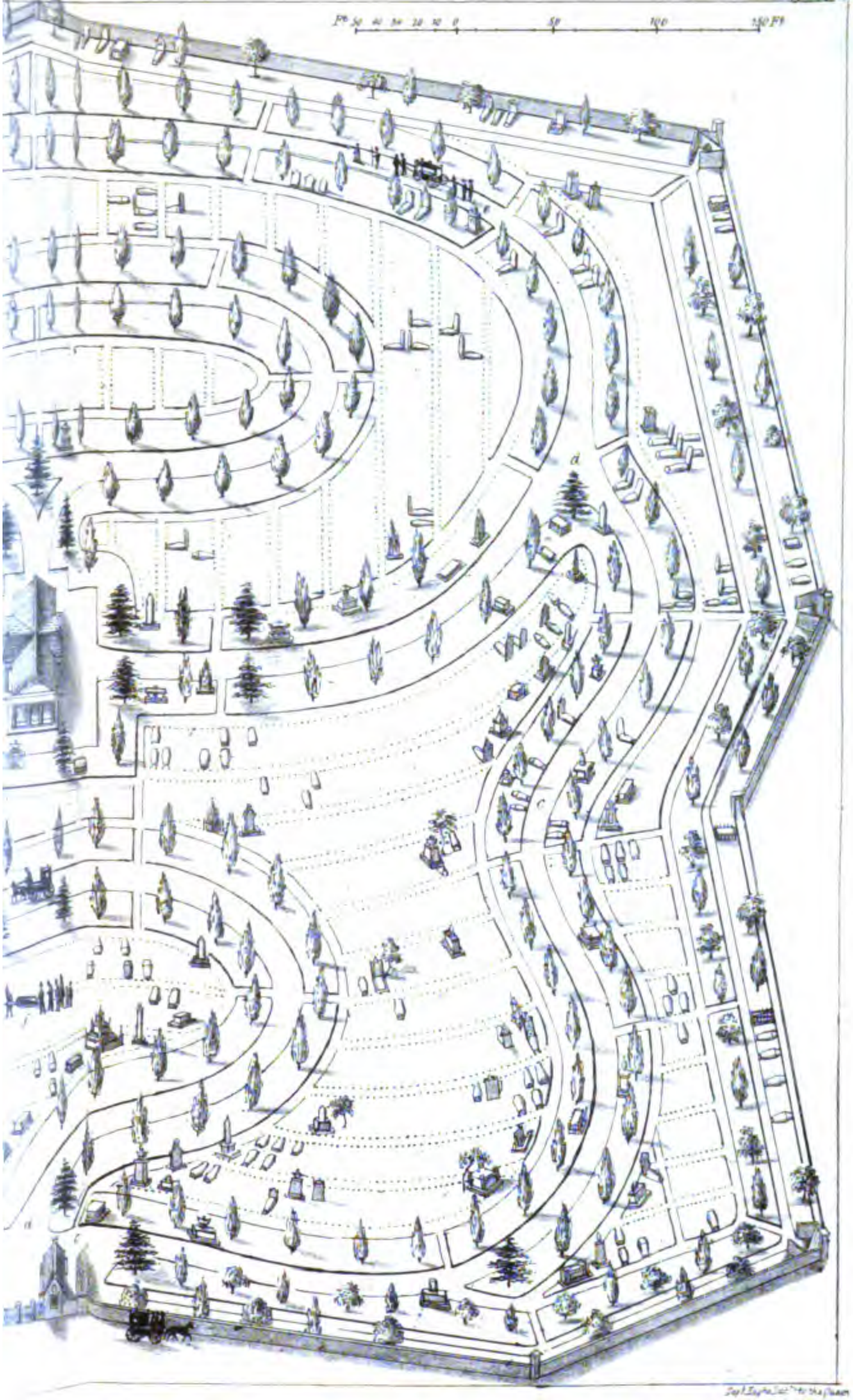


FIG. 20. DESIGN FOR LAYING OUT AND PLA

Fig. ~~41 Pl 66~~ 90. p. 41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PLANTING A CEMETERY ON HILLY GROUND.

London cemeteries as throughout the country; and in our opinion it would be well to tax it in such a manner as to do away with it altogether.

The interments made in a single grave, whether common graves or family graves, are too numerous in proportion to their depth. The distance at which coffins are placed apart is seldom more than a foot, sometimes even the coffin is laid bare, the evils resulting from which are: 1st, that when an interval of two or three weeks or months elapses between the interments, the earth to be removed is so offensive as to reduce the grave-digger to drinking, and shock the bystander by the smell of the earth brought up to the surface; and 2d, that by placing so many bodies in one grave the gases of decomposition must, when the grave is filled, unavoidably reach the surface and escape into the atmosphere. The remedy for both evils is to place and retain a layer of earth of 6 ft. in thickness over each coffin; because we consider it as proved by the general experience of grave-diggers throughout Europe, that no evil results from the decomposition of a body with this thickness of soil over it. The manner in which the soil operates is this: having been recently moved and the parts separated, the interstices are necessarily filled with atmospheric air; and as the gases are generated in the coffin they expand, rise into the soil, and displace the atmospheric air, or mix with it. In this way this poisonous gas, instead of rising into the air itself, only forces out of the soil a portion of atmospheric air equal in bulk to what was generated in the coffin. When the layer of 6 ft. of soil over the coffin is not next the surface, but perhaps many feet beneath it, the mephitic air may still be assumed as driven into the soil immediately above the coffin, so that in whatever position the layer of 6 ft. may be relatively to the ground's surface, it may always be assumed, for all practical purposes, to contain the greater part of the mephitic gases which escape from the coffin. A certain proportion of these gases will also escape laterally, at least in all soils through which water will filtrate freely, such as gravels and sands; but scarcely any will pass laterally through clays, and none through the sides of a brick grave, unless these are built chequered with openings, as has been recommended in p. 155.

If the principle of having 6 ft. of soil over every coffin were adopted, the mode suggested in p. 98. and p. 216., of having movable covering stones to be inserted after every interment, as soon as 6 ft. of soil had been filled in and well rammed, would be found a useful guide to the grave-digger, who would stop whenever he came to the stone, and take it out and reserve it till after the interment was effected.

All the inconvenience that would result to cemetery companies by compelling them to have 6 ft. of soil over every body would be merely that of excavating to a greater depth; and, as we have said before (p. 216.), there can be no reason why graves should not be as deep as wells.

In some of the London cemeteries the coffins in brick graves are placed one over another, and separated only by two iron bars, the ends of which are inserted in the side walls, the space between the last-inserted coffin and the ledger or covering stone at the surface of the ground being left open, and consequently the whole of the coffins in the grave communicating with its atmosphere. It is evident in this case that all the gases of decomposition will escape into the open space, and, by their expansive power, force out part of the mortar or cement under the covering stone; but, even if it should not do this, there must be great danger every time the covering stone is taken off, and more especially as it is necessary for a man to descend to the last-deposited coffin, in order to insert two bars over it to bear the coffin about to be deposited. The remedy for this evil is to cover every coffin with a flag-stone or slate, resting on ledges projecting from the side walls, and rendered perfectly airtight, by covering the joints with a coat of cement of several inches in thickness; or, in default of this mode, embedding and covering the coffin tion of sealing up is effectually performed) to the grave-digger and the public.

We object to the system of laying out a cemetery in imaginary squares, for various reasons: it does not allow of an obvious order and arrangement of the graves; it does not admit of walking among them on a continuous path; it affords a very unsatisfactory mode of registration, since it depends on the accuracy of the mapping of the graves in the map book; it renders it next to impossible for the relations of the deceased to find out the grave without the aid of some person connected with the cemetery, unless the grave has a monument; it prevents an efficient system of grass paths from being formed; and it totally prevents the establishment of a permanent system of surface drainage by having the drains under the paths. It will not be denied, we think, that in all the London cemeteries there is an appearance of confusion in the placing of the graves and monuments; there is no obvious principle of order or arrangement; no apparent reason, except in the case of graves placed along the margins of the walks, why monuments should be situated where they are, rather than any where else; the greater part of them seem to be put down at random; and, in the crowded parts of the cemeteries, the time is fast advancing, when, as in the Père la Chaise Cemetery, no monument will be approachable, but by scrambling through between a number of other monuments. In our opinion all the cemeteries require reformation in this particular without a day's delay.

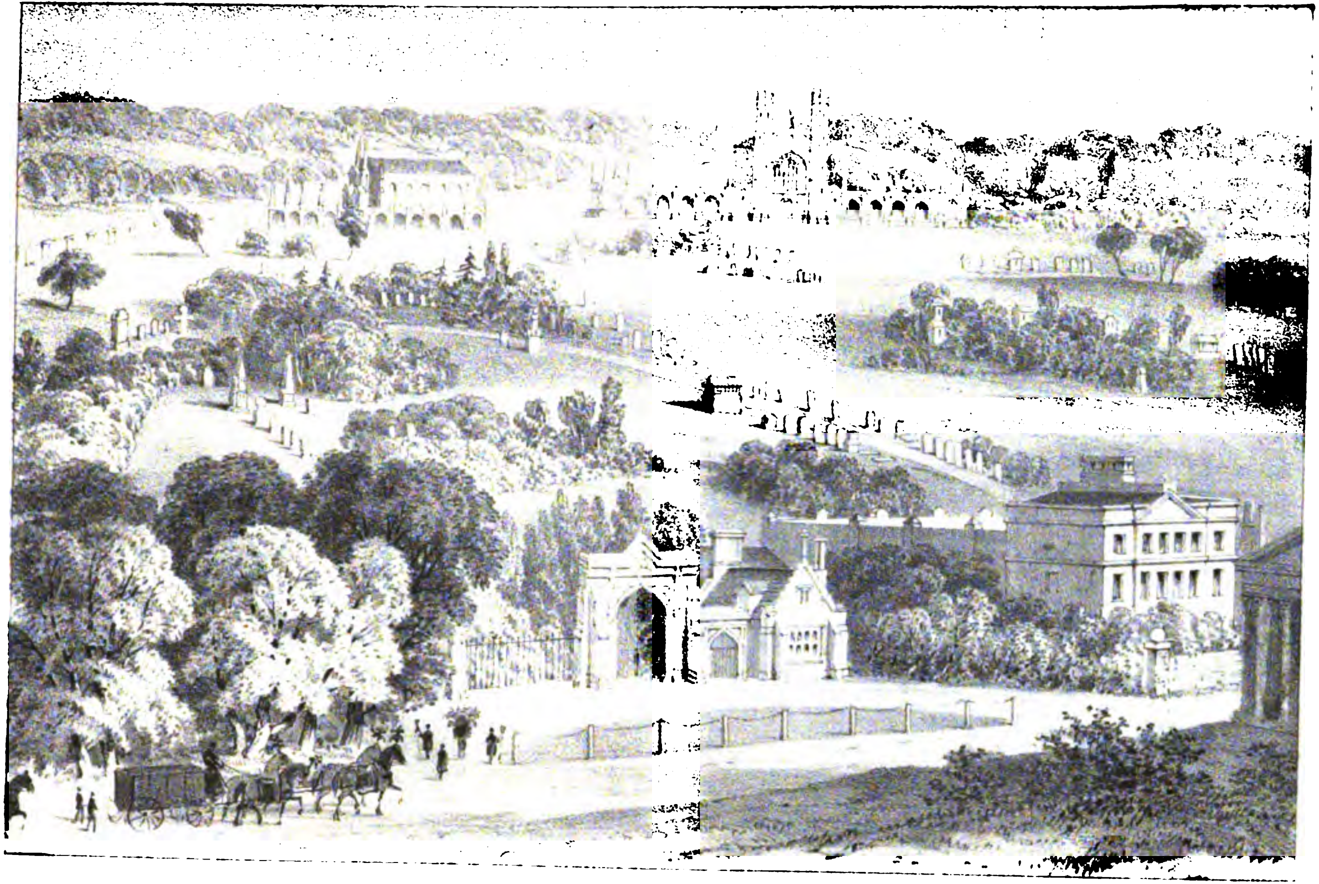
As the greater number of the London cemeteries are on a retentive clayey soil, a system of surface drainage is absolutely necessary to allow the grass to be walked on with comfort during the greater number of days in the year: but we pronounce it to be impossible to execute a system of surface drainage which shall be permanent, where the imaginary square system is adopted; because, in the carrying out of that system, every drain is liable to be interrupted by a grave either made or to be made.

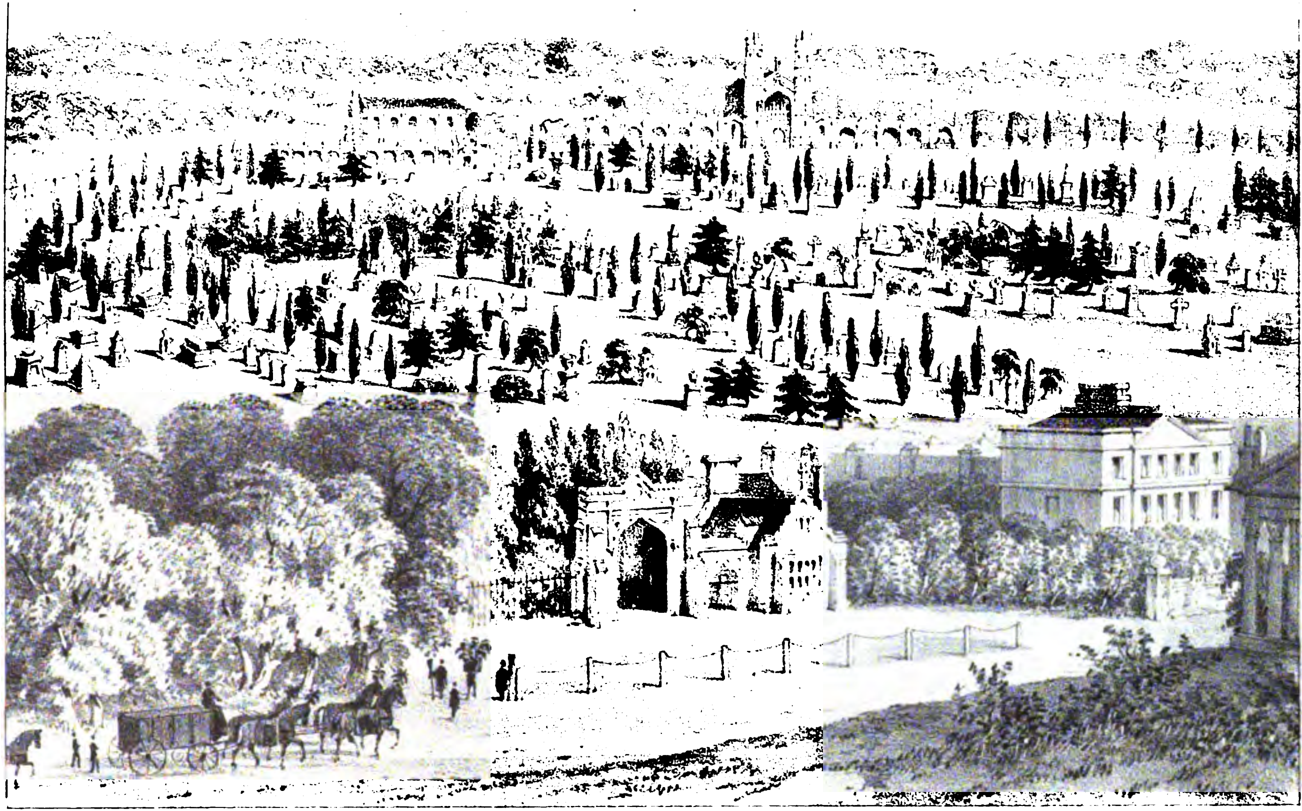
The system of laying out the roads is objectionable in some of the cemeteries; because it is not continuous, but interrupted by branches claiming to be equally important with the main road. The purposes for which a road is made are, to allow of using, and also of displaying, the country, estate, or scenery, which it passes through; and hence in every country residence, garden, and cemetery, there ought to be one master road, by going along which the whole residence, garden, or cemetery, might be surveyed, without the attention being drawn off by side or branch roads of equal breadth and importance with the main road. The whole of some of the London cemeteries could not be seen without going over a considerable part of the roads twice, a circumstance which, with reference to use, is attended with loss of time, and, in regard to effect, with diminished force of expression. In some the main road, even when conducted near a straight wall, is made to serpentine in a manner which, being unaccounted for either by natural or artificial obstacles, such as inequalities of surface or trees, is quite ridiculous.

There ought not to be a road or a walk in any cemetery, the direction of which is not accounted for, by the boundary fence, the inequalities of the surface of the ground, by cemetery buildings or tombs, or by the disposition of trees and shrubs.

In all the cemeteries there is a great want of gravel walks, which always afford fine opportunities for borders of graves, with intervening trees or shrubs. (See the plan *fig.* 90.)

The planting of all the cemeteries is, in our opinion, highly objectionable, for various reasons already given. It is too much in the style of a common pleasure-ground, both in regard to the disposition of the trees and shrubs, and the kinds planted. Belts and clumps can never be required in a cemetery either for shelter or shade; because nothing is so desirable as to have a free current of air, and admit the drying influence of the sun; and because it is impracticable to form graves in clumps and belts. By scattering the trees and shrubs singly, graves may be everywhere formed among them; and, by placing trees continuously along the roads and walks, shade is afforded to





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those who are on them, and a foreground is established to the scenery beyond. But the plantations in most of the London cemeteries appear to have been made without the guidance of any leading principle. In one we have a thick belt round the margin, occupying one of the finest situations which any cemetery affords for border graves; in another we have scarcely any trees along the walks, while we have a number grouped together along the centre of the compartments, where they lose much of their effect; in another we have clumps scattered throughout the grounds without any connexion among themselves, or with any thing around, destroying all breadth of effect, and producing neither character nor expression. In one cemetery there are so few trees that the whole of the ground and the buildings are seen at one glance as soon as we enter the cemetery gates; in another trees have been planted which it might have been foreseen would never thrive.

The kinds of trees we object to, because they are chiefly deciduous, and such as produce light-foliaged bulky heads, while fastigiate conical dark needle-leaved evergreens shade much less ground, produce much less litter when the leaves drop, and, by associations both ancient and modern, are peculiarly adapted for cemeteries.

The Norwood Cemetery Company has published an engraved view of its grounds, of which *fig*. 91. is a fac-simile; and, to show the different effect which dark-foliaged fastigiate and conical trees would have had, we have prepared *fig*. 92., in which it will be observed that the foreground and distance are the same as in *fig*. 91., and that we have confined our alteration to the middle of the picture. We do not say that every one who compares the two pictures will prefer ours to the other, because we do not allow every one to be a judge in this matter; but we do expect that all will acknowledge that there is a distinctive character in our view, and this is what we chiefly contend for. Every one knows that this character is aimed at in the new cemeteries formed on the Continent, and that the cemeteries of the ancients were characterised by the cypress. To show that this is also the case with the cemeteries of the East, we have given some views of Oriental cemeteries. See *figs*. 93, 94, and 95.

In several of the cemeteries pines and firs have been planted without properly preparing the soil, in consequence of which they have become stunted and diseased, so as to disfigure rather than to adorn. On the whole it appears to us, that almost all the cemeteries have not only been badly planted, as far as respects design and taste, but even in regard to execution, and in particular in the preparation of the soil.

The next point on which we would remark is the management of the tombstones, many of which, we are happy to say, exhibit progressive improvement in taste. Many, at the same time, appear to have been placed on insufficient foundations, and are in consequence already leaning to one side. Every headstone, monument, or tomb, to be secure and stand permanently upright, ought either to be founded on ground which has not been moved, or built on piers or walls of brick or stone carried up from the bottom of the grave.

The keeping of the new London Cemeteries is in general good, though it is very far from what it might be. In some it is highly discreditable, sheep being admitted to eat the grass, to save the expense of mowing, and the young trees being in consequence cropped by the sheep, and poisoned by their wool. In general a sufficient number of hands are not allowed for high keeping, and day-work is had recourse to, where letting by the job would be more economical to the company, and satisfactory to the labourers. The mowing of the grass, and the keeping of the roads, might be let by contract, and the grass kept much shorter than it is at present; because the contractor would soon discover that the shorter he kept the grass, the less mowing would be requisite: whereas at present, by way of being economical, the grass is allowed to attain several inches in length between each growing; or its roots are nourished by the dung of the sheep that graze on it.

In conclusion, we have to observe that, in our visits to the different London

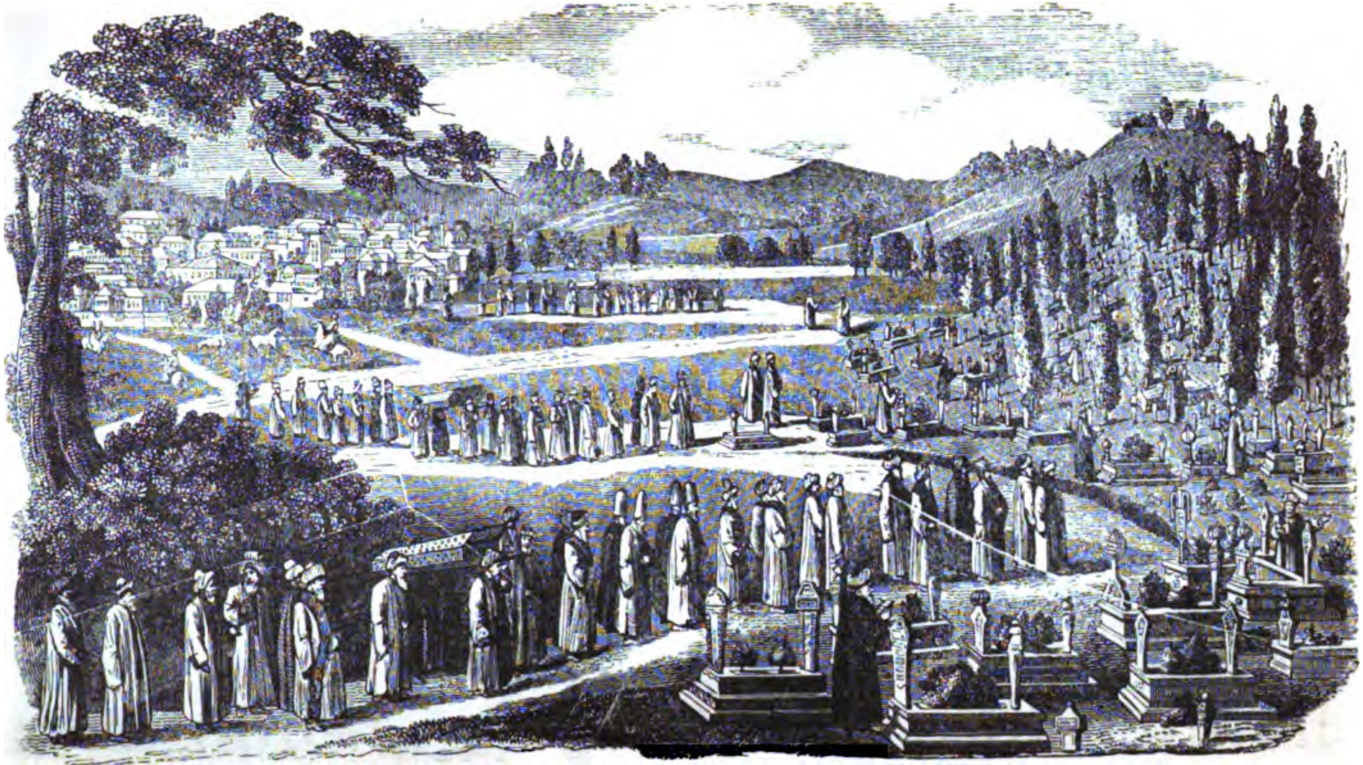

Fig. 93. *Cemetery of Eyub, near Constantinople.*

cemeteries, we have received the greatest civility and attention from the superintendants; and, at the respective offices in London, every information has been afforded us by the secretaries with the greatest readiness and politeness.

As examples of the Eastern mode of planting cemeteries with cypress-like trees, we shall give from the *Encyclopædia of Gardening*, by the permission of the proprietors, engravings of the Turkish cemeteries at Pera and at Eyub, both near Constantinople, and of the Cemetery of Hafiz in Persia. We shall add two examples of Chinese cemeteries, in which are planted trees of various forms and characters.

The *Turkish burying-grounds* "are generally favourite places of public resort. The principal promenade in the evening, for the inhabitants of Pera, is a very extensive cemetery, which slopes to the harbour, is planted with noble cypresses, and is thickly set in many places with Turkish monuments. The opulent Turks have their graves railed in, and often a building over them, in some of which lights are kept constantly burning. The inscription on the head-stones is usually a sentence from the Koran, written in letters of gold. The Turks, like the Welsh, adorn the graves of their friends by planting flowers upon them, often the myrtle, but sometimes the amaryllis. (*fig.* 94.) (*Williams's Travels*, &c., p. 201.) The vicinity of a cemetery is not in the capital of Turkey judged by any means disagreeable, and no spot is so lively and well frequented as the Armenian and Frank burying-ground, at the outskirts of Pera, called Mnemata, or the tombs. It is shaded by a grove of mulberry trees, and is on the edge of some high ground, whence there is a magnificent view of the suburb of Scutari and a great portion of the Bosphorus. (*Hobhouse's Travels in Albania*, vol. ii. p. 837.) The cemetery of the Turks at Constantinople is the fashionable quarter of the Franks, and the pleasure-ground of the Levantines. It is the only place of recreation in Pera. (*Madden's Turkey*, p. 204.) The Turkish cemeteries are generally out of the city, on rising ground, planted with cedars, cypresses, and odoriferous shrubs, whose deep verdure and graceful forms bending in every breeze give a melancholy beauty to the place, and excite sentiments very congenial to its destination. (*Eustace's Travels*, &c., p. 45.) The Cemetery of Eyub, near Constantinople, is crowded with graves; those which contain males have generally a turban at the head of the flat tombstone, and nearly all have plants growing from the centre of the stones. (*fig.* 93.) The magnificent

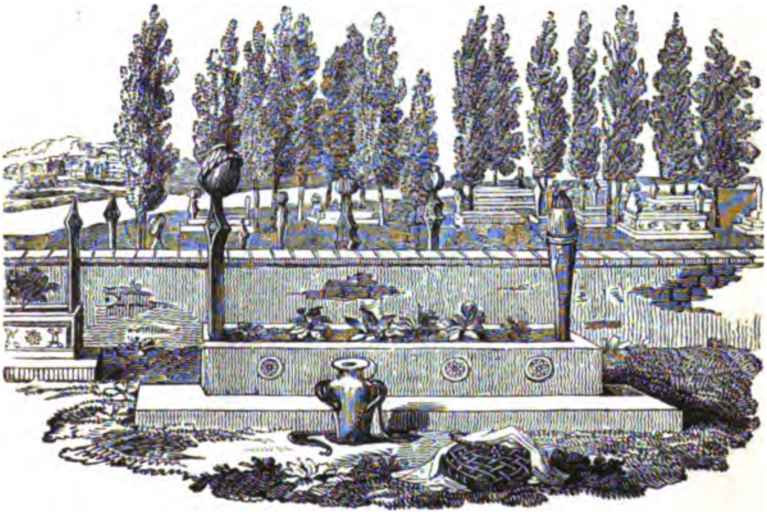

Fig. 94. *The Turkish Cemetery of Pera.*

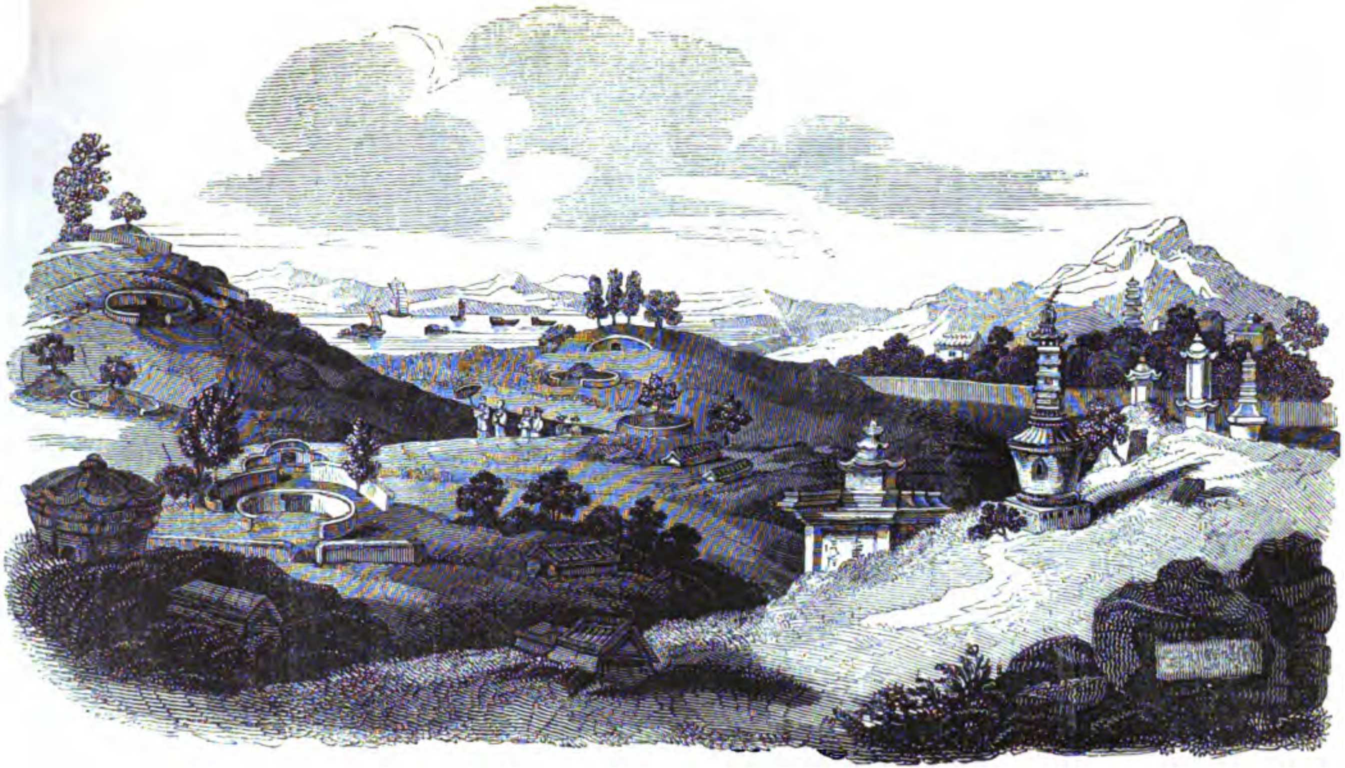

Fig. 95. *The Cemetery of the Vale of Tombs, in China.*

burial-ground of Scutari extends for miles in length, and among high and turbaned tombstones, with gold-lettered inscriptions, mournful cypresses are thickly planted. (*Alexander's Travels from India*, p. 240.) There is a very large burying-ground, shaded by an extensive forest of cypresses at Bournabat, a village of elegant country houses built in the European fashion, belonging to the merchants of Smyrna. (*Hobhouse's Travels in Albania*, vol. i. p. 640.)" (*Encyc. of Gard.*, ed. 1834, p. 300.)

Persian Cemeteries.—" There are said to be 1001 mausoleums at Shiraz; those of Chodsja Hafiz and Saadi Sjeraft (both celebrated poets) are the most beautiful. The burial-place of the first (*fig.* 96.) is situated at Muselli, an estate possessed by Hafiz, who, it is remarked, was not buried by the nation, but had the expenses of his funeral defrayed out of his own private fortune. His cemetery is square and spacious, shaded by poplars (a rare tree in Persia), and having a lion carved in stone on each side of the entrance. The wall is built of brick, and coincides in direction with the cypress trees of the surrounding garden. The ground is strewed with tombstones, and divers sepulchral memorials of those who had desired to be buried under the guardian influence of the poet. Entering from the neighbouring garden, which was bequeathed to the cemetery, the keeper conducts a stranger into the place of the sepulchre. This is surrounded by lattice-work, and contains three tumuli besides the grave of the poet; one encloses the remains of a secular prince, and the other two illustrious individuals, who, when living, were disciples of Hafiz. In the place of the sepulchre sits a priest, who repeats verses from the Koran in praise of the illustrious dead, and enumerates their virtues; when he has finished, another, and afterwards a third, in the open burying-place, take up the same theme; so that the lamentations are incessant. The tombs are placed in a row; and the form of all of them is the same. They are about the size of a sarcophagus, and have each a large stone, about a man's height, at both ends. The stone of which they are made is of a common kind, and unpolished. On each side are sculptured verses from the Koran, and on the stones placed at the feet are elegant epitaphs. Hafiz died A. D. 1340. (*Kæmpfer's Amœn. Exot.*, &c., fas. ii. rel. vi. p. 367.)" (*Encyc. of Gard.*, ed. 1834, p. 371.)

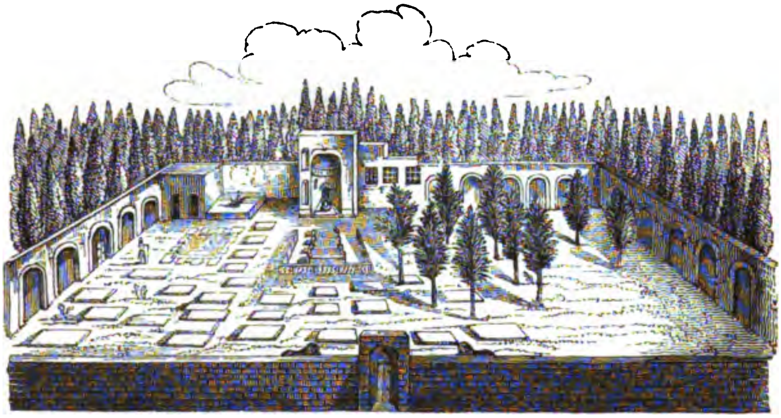

Fig. 96. *The Cemetery of Hafiz.*

In the *Chinese cemeteries* (*figs.* 95. 97.), trees of various descriptions are introduced, and the tombs are of very remarkable forms. " About Canton and Macao the high lands are very little cultivated, being generally set apart for burying the dead; those about Canton are entirely occupied as cemeteries, the low grounds, which can be covered with water, being the only ones which will produce rice. (*Dobell's Travels*, &c., vol. ii. p. 191.) Sometimes, however, the

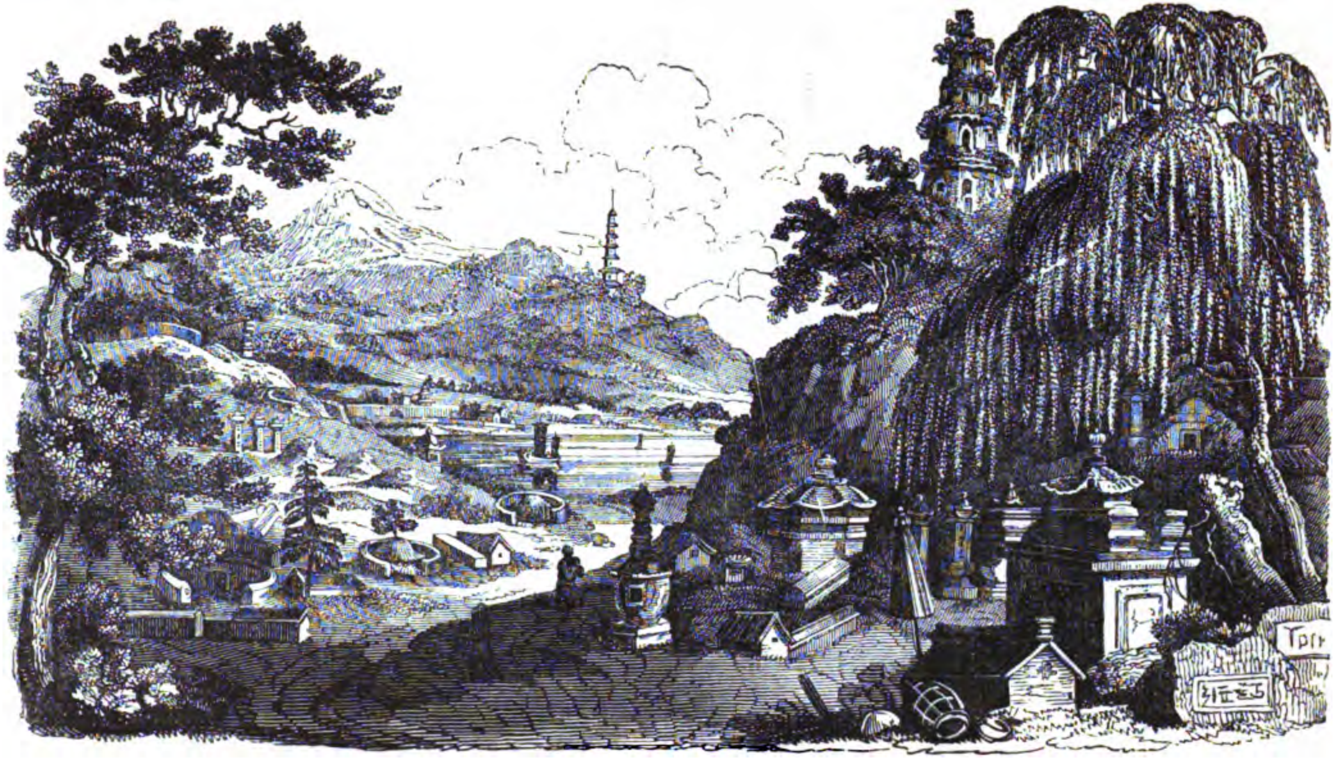

Fig. 97. *Chinese Cemetery, near the Yellow River.*

Chinese choose a valley for a cemetery, as that of the Vale of Tombs near the lake See Hoo. (*fig.* 95.) The Chinese burying-place near the Yellow River (*fig.* 97.) is a specimen of a cemetery on high ground." (*Encyc. of Gard.*, ed. 1834, p. 338.)

(*To be continued.*)

Art. IV. *On the Hornet.* By J. Wighton.

Some persons doubt if the hornet mentioned in Holy Writ be the same kind as our hornet: they ground their doubt on the fact that hornets, like wasps, will seldom attack or sting any one without provocation. This, however, is groundless; for He who sent the hornet as a scourge on the Canaanites would make them fulfil it; and, though we are not told of the fulfilment of the scourge, still we may conclude that it was fulfilled, and that too dreadfully. But be all this as it may, though the hornet be not the largest stinging insect we have, still it is the most formidable one. Fortunately hornets are not so numerous as their fellow species the wasps, otherwise they would strike terror, especially to those that startle at the sight of a wasp or a bee. I have conversed with several who have been stung by hornets, and they said the pain was great: I have been thrice stung by them myself, and, except in one, the pain was not much greater than I have felt from the sting of a wasp; and that was not enough to make me believe the old saying, that "nine hornets could sting a horse to death." Some feel more pain from a sting than others; there are even instances of persons dying from the sting of a bee, but such are rare occurrences, such as that of a prick from a pin or thorn causing death. However, I wish none to be stung by hornets; my object is only to mention something about their habits. In doing this, I find I can glean but little from authors: they merely say that the hornet is a species of wasp, and their habits are similar. Professor Wilson, however, observes that the *Véspa Cràbro* (the hornet) has never appeared in Scotland.

Though the hornet is a species of wasp, indeed it may be called the king of the wasps, yet it differs a little from the wasp in its habits: for instance, the hornet rarely builds its nest in the ground, and we never find it suspended from a branch in the open air. A dry hollow tree, and somewhere under the roof of a shed or barn, are the favourite sites of the hornet. When in possession of either of the latter places, their nest may be seen fixed to a spar by several little props or pillars, having a large opening below: in this respect it differs from the wasps' nests, especially those seen upon a branch; they are closed below, except a small hole or two to enter at. The opening is to allow the excrement from the insects to pass through, it being far greater than from wasps; so much so, that from a strong colony of hornets a filthy fluid is always dropping. In spring, the hornet, like the wasp, begins her nest alone. Both collect their materials from decayed wood, and the hornet chooses that which is more decayed. It seems doubtful if either use saliva or resin from trees in working up the materials. Hornets may be seen entering their nest with clear drops in their mouths, which differ neither in touch nor taste from water: whether this fluid is to carry on the structure, or to feed the brood, I cannot rightly say; but I suspect it is for the former purpose. The materials, being so very dry, of course require moisture before they can be formed into paper, which is of a coarser texture than that formed by the wasp. Both rear their structures nearly alike, except that the hornets' cells are made larger; viz. the combs are ranged horizontally, and form many distinct parallel stories, supported by many little pillars; more are added as the weight increases, and they are sometimes attached to the cocoons of the insects while in their cells, and are cut through when they come forth. The mouths of the cells are downwards; consequently the tops of the combs are composed of the bases of the cells, and form nearly a level floor, on which the insects can pass and repass. The spaces between the first-formed, or workers', combs in the hornet's nest are about half an inch high, in those of the queen 1 in.; but the spaces in both are reduced by the cocoons of the insects, especially that of the queen, which protrudes beyond the rest. Though hornets' cells are larger than those of wasps, still they are not so numerous, and of course their progeny is less, except the queens and drones, which are far greater, and are reared last in the colony: they amount to several hundreds; indeed, the whole cells in autumn are occupied by them. The drones are principally in the workers' cells, but they are found also in those of the queen: those bred in the latter appear to be of a larger size. It is not so with the wasps; among them the drones and queens are bred together in larger cells in the last-formed combs, and working wasps are reared until the colony disperse.

I have made these remarks from a hornet's nest taken from a hollow tree on the 25th of Sept. At that time the wasps were getting weak, and careless about their nests, while the hornets were in full vigour. The nest contained nine divisions of combs, full of eggs and brood; even the last comb, or rather the embryo of one, being only five cells, just begun, contained eggs a little larger than wasps'; but, like theirs, deposited on one side, a little from the bottom of their cells. This affords room for the excrements from the grubs, which was the black substance found in the empty cells when the colony was upset. It contained more drones and queens than workers; several hundreds more came forth. During a month nine kept the nest in a hothouse; but, strange to say, not one worker, their cells being full of brood drones, as already noticed. I put one worker into the nest: though wingless, he foraged about, and, on the least alarm, he was always the first to appear. When pressed with hunger, he came with the rest and ate from my hand. I cannot say whether the drones or young queens take any part in the colony; the former quit in search of food; they are larger than the workers, are known from them by their long dark feelers or horns, and by having no sting. The queens are larger; I never saw them abroad in search of food; probably they are fed by the workers, and before becoming torpid eat the dying larvæ. It may be worthy of remark, that, though there were many males and females in the nest alluded to, I could not discern them meeting to insure a future increase; as the drones and workers perish at the end of the season, it must take place before then. The queens, like those of the wasp, hide themselves during winter amongst dry moss, &c., in a torpid state, until the warmth of spring calls them forth to begin fresh colonies.

Since the above was written, Dr. Neill, who is well known as a naturalist as well as a horticulturist, sent me word that he has never met with the *Véspa Cràbro* in Scotland. I cannot do better than give his own words on this subject: — "I sent the hornets to the Rev. J. Duncan, in whose rich collection they will have a place. He writes me thus: 'I have no hesitation in saying that you may assure your correspondent that the hornet does not occur in Scotland. I have stated this as my belief in a paper on the Wasp, in the 12th volume of the *Quarterly Journal of Agriculture*. I never saw a hornet in this country, nor ever heard of one occurring. It extends much farther north on the Continent; but we cannot infer from that that it should likewise be found here. It is so conspicuous and formidable an insect, that, had it existed here, it is not likely it would have been overlooked.' From such evidences, especially the Rev. J. Duncan's, who may be styled the Scottish Kirby, we may conclude there are no hornets in Scotland; and it is very natural for us to ask why. Want of proper food cannot be the cause, for wasps find nourishment there. The wet and cold variable springs in Scotland may have something to do with it, by arousing the insects at an improper time; but not all, for the hornet can endure, perhaps, more cold than the wasp, they are often abroad both night and day after the wasps disappear. I may add, that I once exposed hornets abroad during a cold night; in the morning they were covered with rime frost, and dead to appearance; but when placed in the warmth they soon began to hum. Perhaps the cause may be owing to something peculiar in the insect for local districts; for instance, it is said that the hornet is not found in Cambridge or Lincolnshire: the fact that they abound in Norfolk, an adjoining county, is in favour of this. There is one thing, however, much against it; that is, hornets are never so numerous as wasps; yet there are more queens reared in their nests than in those of wasps. This argues in favour of the climate and food being more against their increase. The hornet may be considered more an inhabitant of woods than the wasp; and, as regards food, though they visit the garden and orchard in search of it, still their greatest supply is from the forest. They will unbark the young shoots of trees; for instance, the ash: frequently the shoots appear as if they had been eaten by rabbits. This shows they have great power in their mandibles; and it is a curious fact, that, like some other insects when in confinement, in a pill-box for instance, they do not attempt to escape by cutting through it, which they could do in a few minutes."

Hornets have been very numerous during the last season. I have assisted in destroying many of their nests, which gave me an opportunity of observing their manner of defence. If their nests had not been previously disturbed, they might be approached with safety; if otherwise, not. At first, when the attack is made, those that issue from the nest show bold resistance, yet seldom sting without giving notice of their intention, by whizzing with great force close by one's ear; but, for all their strength and courage, they sooner give way than their weaker fellows the wasps: these are waspish to the last, while the hornets that escape hum off in the distance.

Cossey Gardens, April 4. 1843.

ART. V. *Some Account of the Insects which attack the Raspberry.* By J. O. WESTWOOD, F.L.S., Secretary to the Entomological Society of London.

THERE are but few species of insects which materially injure the leaves or fruit of the raspberry. This plant, like most vegetables, has, of course, its aphis and its lepidopterous caterpillars which gnaw the leaves; but the obnoxious species may be considered as consisting only of the grub of a moth which attacks the bud, and that of a beetle which attacks the fruit. Of the former, the individuals are produced in the preceding autumn, and are thus of a considerable size when the spring developes the buds, into the base of which they burrow and penetrate to the heart, consuming the embryo flowers and leaves in the same manner as I have described in my account of the caterpillar of the apricot moth. The buds thus attacked may be easily known by their faded appearance, and should be hand-picked and destroyed.

The other insect above mentioned does not commence its attacks until the fruit approaches maturity. Many of the berries may now be perceived more or less shriveled, with the seed-vessels dried up. If one of these be opened, the central core of the fruit will be found more or less burrowed, as well as the fruit, the seeds of which are left bare and dry, especially at

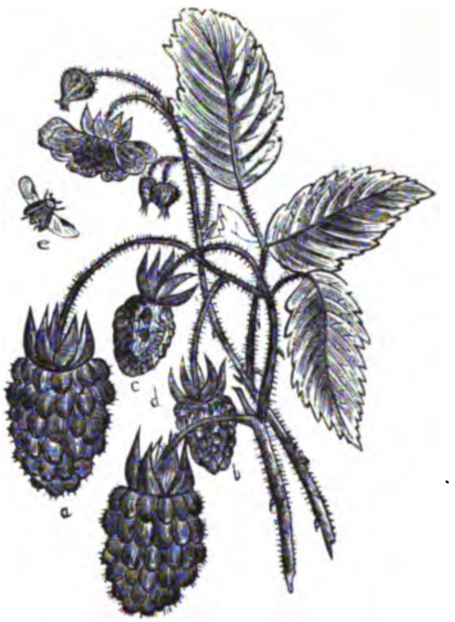

Fig. 98. *The Raspberry Beetle.*

a, Full-grown raspberry. *b*, Raspberry attacked by the larva, and not arrived at the full growth; many of the seed-cells dried up. *c*, The same opened, to show the larva on the core, into which it burrows. *d*, The larva. *e*, The perfect insect flying, of the natural size.

the top, the remainder not being full-sized, and generally prematurely ripe and discoloured. This is done by a whitish grub, of about a quarter of an inch long, and rather cylindric in figure; with the under side of the body and sides, and articulations of the segments, dirty white; the head and a dorsal plate on each ring brownish buff, with the sides and a central longitudinal line on each plate brown, thus giving the appearance of three dorsal lines of brown. The head is horny, and furnished with horny jaws and short feelers, as well as with the various membranous parts usually present, composing the under portions of the mouth of the larvæ of Coleóptera. The grub is also furnished with six short scaly articulated feet. It has also two short scaly horns on the upper side of the extremity of the body; the under side being furnished with a fleshy retractile tubercle, which the insect uses as a seventh foot. When full grown it descends to the earth, where it buries itself to a considerable depth, forming for itself a small oval cocoon of earth, with the inner surface quite smooth. Here it assumes the ordinary pupa state to which all coleopterous insects are subject. Some individuals which I reared did not arrive at the perfect state till the following spring, when they produced the Bytùrus tomentòsus, a small buff or slaty brown coloured oval beetle, with knobbed antennæ, which is to be seen flying about the raspberry plants in the spring and summer, and which is also very partial to the hawthorn and blackberry.

I am the more desirous of stating the result of my own observations, because Mr. Curtis, in his account of this beetle, appears to be in some doubt whether the maggots found in the fruit of the raspberry are those of this insect; whilst Messrs.

Kirby and Spence state that, when *in flower*, the footstalks of the blossom are occasionally eaten through by the *D*ermèstes (Bytùrus) tomentòsus, which they once saw prove fatal to a whole crop. They also add, "that bees frequently anticipate us, and, by sucking the fruit with their proboscises, spoil it for the table." A more nauseous annoyance is, however, sometimes produced by some of the winged bugs (chiefly species of Cápsus), which protrude their rostrums into the fruit, leaving behind a taste very much like the smell of the bed-bug.

The following are the systematic details of the species in question: —

Order, Coleóptera (or beetles).
Section, Pentámera (with 5-jointed tarsi).
Family, Nitidùlidæ.
Genus, Bytùrus *Latreille* (*D*ermèstes *Fabr.*)
Species, Bytùrus tomentòsus *Fabr.*
Variety, *D*ermèstes fumàtus *Fabr.*
Synonyme, *S*ílpha testàcea *? Linnæus.*

Length, about one sixth of an inch; body oval, densely clothed with luteous, yellowish, brownish, or greyish pubescence; the forehead depressed and punctured; the eyes large and black; the thorax punctured, as well as the elytra; the legs, antennæ, and mouth palè buffish, or ochre-coloured; the body beneath dark brown, with the extremity lighter-coloured.

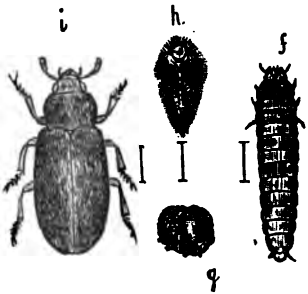

Fig. 99. *The Raspberry Beetle.*
The larva magnified. *g*, The cocoon of earth, opened at one end. *h*, The pupa, seen on the under side, magnified. *i*, The perfect insect (the lines show the natural length), magnified.

Hammersmith, Sept. 15. 1842.

Art. VI. *Dinbur Castle, its Gardens, and its Gardeners.* By Peter Mackenzie.

(*Continued from* p. 110.)

When the night arrived on which Colin Forbes was to take his turn in imparting useful information to his comrades, he told them that what he intended to communicate might be thought by some to have little connexion with gardening, but he hoped, before he was done, he would be able to show that the subject was worthy of a gardener's consideration.

Hydrodynamics formed the science to which he intended to direct their attention for a short time; and he glanced in their order at the four principal parts into which it is divided, viz. Hydrostatics, which explain the laws of the equilibrium of such fluids as water; and Hydraulics, which explain the laws of their motion; Aerostatics, which treat of the laws of the equilibrium of such fluids as air; and Pneumatics, which treat of their motion. "Before I proceed any further," said Colin, "I will inform you of the circumstance which first turned my attention to the subject. In the first year of my apprenticeship, whilst we were enlarging the pleasure-ground, part of the operations were extended into a field but poorly supplied with water. In the course of working we came upon a small spring, which the gardener thought would be of great benefit to the cattle if it were conveyed to a proper place for their use. A gentleman happened to be present who held a situation under government, and whose business it was to superintend ground work. His opinion was that it would be useless to expend money upon the spring; because it appeared so weak, and the field so level, that, when the water began to collect, its own weight would prevent the spring from running. The gardener, however, thought differently. He believed that, however weak the spring might be, it would rise to its level although it had a lake to oppose it; and the spring, for any thing he knew, would balance an ocean; or else he had been wrongly instructed. The gentleman was not at all pleased at having his opinion controverted by one whom he considered his inferior; but both were willing that a temporary dam should be made in order to test their knowledge, and I watched the rising of the water from day to day until it ran over its appointed boundary. The gentleman obtained a lesson which he would perhaps remember all the days of his life, and the cattle obtained water, which was a great benefit both for them and their owner. Sometime after I fell in with part of Playfair's *Outlines of Natural Philosophy*, which gave me a little help on the subject. I also procured an odd number of Nicholson's *Journal*, containing an article entitled 'A Summary of the most useful Parts of Hydraulics, chiefly extracted and abridged from Eytelwein's *Handbuch der Mechanik und der Hydraulik.*' These short treatises gave me new views of common things."

Colin Forbes then began to explain to the other lads the equilibrium of fluids, and taking his spirit level showed Bauldy how to use it. He showed them that it is upon the tendency of all the particles of fluids to come to a level that the making of leveling instruments depends: and, if the person who opposed the collecting of the water had remembered that, if a communication by means of a tube or pipe, either straight or crooked, be made between the water in one vessel and that in another, the surface of both will be at the same level before the water is at rest, and if he had also remembered that the water in the spout of a teapot will balance all the water in the pot, he would never have acted as he did. If persons would accustom themselves a little more to observation and thinking, they would be less liable to fall into blunders. It is no uncommon thing for gardeners to superintend the formation of ponds and lakes in pleasure-grounds, and it is of great importance to know something about the nature and properties of the materials they have to deal with; for accidental circumstances frequently cause much mischief, not easily repaired. He once knew a flower-garden nearly ruined by the breaking down of a small lake; gravel was washed upon the ground, and many of the shrubs removed by the force of the water. Whereas, if proper attention had been paid in the erection of the dam, the disaster would have been prevented. He then gave some illustrations of the pressure of fluids, and made them acquainted with the hydrostatic paradox. He laid down the rules for finding the pressure of water upon level and sloping surfaces, and for finding the centre of gravity, and the centre of pressure, as well as the specific gravity, of bodies in general; and demonstrated the principle on which the siphon works, and its application to horticultural purposes. He also noticed capillary attraction, and explained to them how glass in garden erections is broken by means of it in winter, when broad overlapping is practised in glazing. He informed them of some of the important offices that are supposed to be performed in nature by capillary attraction, such as the distribution of moisture in the soil, and the rise and circulation of sap in vegetables by means of their fine capillary tubes.

After having explained that part of the science which makes us acquainted with the proportion of the equilibrium and pressure of fluids, he next turned to Hydraulics, that division of "natural philosophy which treats of the motion of liquids, the laws by which they are regulated, and the effects which they produce." He endeavoured to make them understand that important theorem, viz. "The velocity with which a liquid issues from an infinitely small orifice in the bottom or side of a vessel that is kept full, is equal to that which a heavy body would acquire by falling from the level of the surface to the level of the orifice." He next informed them of many things which they did not know respecting the motion of water in various channels, such as rivers, pipes, &c.; pointed out to them the wise provision of Providence in regulating the flow of water in rivers, and preventing it from bringing destruction on the earth; and, by means of the garden-syringe and garden-engine, explained the difference between the ordinary lift-pump and forcing-pump, and the principles on which they act.

It would occupy too much of the pages of this Magazine to state all the varied and interesting information that Colin Forbes imparted that night, in the bothy, to his attentive listeners. He tried to make his statements as plain as he could, illustrated his discourse with very simple apparatus. Some may be deterred from the pursuit of science when they see or read about the splendid apparatus employed in the lecture rooms of wealthy institutions, but it will often be found that the same truths may be conveyed to the minds of a homely audience by means of simple things, easily got, and costing little.

It happened that Bauldy Black was cook in the bothy on the night on which Colin Forbes was to deliver his discourse. Bauldy was rather later than he should have been in preparing the supper, and, during the time he was cooking, Colin was arranging the few things he had collected in order to make his remarks better understood; when it was agreed that he should proceed with his discourse while the supper was cooling. Finding that his remarks on Hydraulics had occupied more time than he intended, he determined on leaving the remainder for another occasion, to the great delight of Bauldy, who appeared very impatient to question him on some things. He told Colin very plainly that he "could na tak in some o' the things that he heard him say." Colin asked him to mention the things he had said which he did not believe, and he would try and help him to understand them better. "Weel," said Bauldy, "didna ye say that a wee drap water in a dish could be made to balance as much as if the dish had been fu o' water? I canna believe that sic a thing can happen."—"Well, Bauldy," said Colin, "would you like if I were to tell you that you were a poor hand at making porridge?"—"No, I wouldna like it, for I will tak in hand to mak parritch wi ony man in Scotland or his wife either; and nane o' yer gruel-like parritch would I mak, that might run a mile on a deal board and burn a body at the end o't; and I'll warrant ye'll get them to yer supper this night that the skin hasna cracked in the coolin, and ye may whommil them out on yer loof and nae scaith come o'er them."—"Well that is just what I want," said Colin; "for you know that when they are well made, like most other substances, they contract in cooling, and a small space is left between the sides of the basin and its contents."—"That's a' true," replied Bauldy.—"Well, if you pour a small quantity of milk into that space you will find that it floats the porridge in the basin."—"I hae done that mony a time," said Bauldy; "but what does that signify?"—"That small drop of milk will press as heavily as if the basin were full of milk, and you suspended the porridge so as to have no weight on the basin."—"Weel, weel, that will soon be tried," said Bauldy. So away he went and got a clean piece of net, and, turning his porridge out of the basin, placed his supper in the net. According to Colin's direction he poured a few spoonfuls of milk into the basin, and placing it in one scale put weights in the opposite one. He then gently lowered the porridge in the net into the basin. The milk rose in it and brought down the opposite scale, so that it required more weight to balance it. When it was brought to balance, the height which the milk rose to in the basin was marked, and he was directed to take out the porridge, which he suspended in his hand, and let the basin remain in the scale. He was then told to pour milk into it until it would balance the weights in the other scale. He thought a small quantity would do it, and as he kept pouring he often looked at the other scale, but it showed no signs of rising until the milk in the basin was nearly as far up as the mark made when the first weighing was done; and, when he saw that it required to rise to the mark before it came to the balance, his wonder was at its height, and he hoped that Colin would forgive him for doubting the truth of the statements he had made.

Walter Glenesk said that he had received much information from that part of the discourse whcih treated of the specific gravity of bodies; for in some systematic arrangements of simple minerals it formed one of their essential characters: for instance, in combustible minerals the specific gravity seldom exceeds 2, water being equal to 1; and in metallic minerals it is commonly above 5 and upwards; while in earthy minerals the specific gravity is generally less than 5. "And although I knew these things," said Walter, "I was not aware that the specific gravity of bodies was so easily ascertained; nor did I know that a hydrostatic balance was so easily made."

"I think you stated," said Sandy Macalpine, "that the rise and circulation of the sap in vegetables are performed by means of their fine capillary tubes. I believe that vegetable physiologists differ in their opinions respecting the channel through which the sap flows; some saying that it is through the tubes of the woody fibre, others that it is by the intercellular passages, and the cause of the upward flow of sap in vegetables is to be found in evaporation and endosmose." — "Endosmose! what in a' the warld is endosmose?" said Bauldy, "that causes the sap to rise in vegetables." — "It is," replied Sandy, "the transmission of gaseous bodies, or vapours, or liquids, through membranes or porous substances, from without inwards. Many operations of nature which philosophers could not satisfactorily account for are explained by this law; for instance, the mechanical mixture of the various gases of the atmosphere. The gases are of different densities, and yet they are said to be blended together in certain proportions without entering into chemical combination. It has been found that dense fluids will combine with those that are more thin; and it is asserted that when evaporation takes place in the leaves of vegetables the fluids in the leaves become thick, and, the thick sap of the leaves combining with the thinner sap of the branches, circulation is set going. Well may we say, with the royal poet of Israel, 'the works of the Lord are great, sought out of all them that have pleasure therein;' and those who delight in studying the works of an Infinite mind will find

'Wondrous truths, and manifold as wondrous.'

And those who have dived into the secrets of nature, and studied hard in the boundless domain of creation, have still much to learn respecting the humble plant by the wayside, or the little-thought-of flower that blooms and dies upon the mouldering towers of our ancestors. Yet there are minds that can read lessons of instruction in 'flowers passing away;' and, while living in the fleeting sepulchre of this world, can enjoy much of its transient gleams of sunshine, and can also be partakers of that enduring felicity that is seated in Heaven."

West Plean, April 8. 1843.

ART. VII. *Notice of Dalvey, the Seat of Norman MacLeod, Esq.*

By A. BRANDEN, Gardener there.

AGREEABLY to your request, I send you some account of these gardens, and of the state of gardening, and of other gardens of note, in this quarter.

The State of Gardening in this Quarter. — Gardening here is in a more forward state than you Southerns might imagine, taking into account this our northern locality and distance from the metropolis, the grand centre from which most new and good things in the floral way emanate.

The gardeners here (as in most other places where I have been) I consider, as a body, to be a most industrious, intelligent, and persevering set of men; many of them reading one or two of the gardening periodicals, several of which, through the kindness of my employer, I am enabled to peruse; and a number of them are either natives of, or have visited, the southern parts of this, or been in the sister isle, where gardening is carried on more extensively than it is here. These few general remarks I have thrown out in the mean time, leaving particulars to a future opportunity, or a more able pen.

Dalvey Gardens. — First let me refer you back to your Volume for 1838, p. 462., where you will find a general notice of these grounds by my predecessor, the then gardener. My task is by that notice lessened to adding a few particulars to the account there given. The houses which were then three are now five; the fourth one being a span-roofed stove, divided by a partition in the middle, one end for the culture of orchidaceous plants, and the other a general stove. The fifth is a pit for heaths, with ventilators in the walls for the admission of air when the weather will not admit of the lights being drawn down. The side walls are of stone, with a temporary erection of boards along the sides (with the ventilating tubes through) for the purpose of holding dry leaves, which effectually protects the walls from frost, the roof being protected with hurdles thatched with bent (coarse grass or rushes). The sides of the hurdles are 3 in. deep, made of boards 1 in. thick, fitting on the roof like common lights on rafters. In this pit, both last season and this, we have kept pelargoniums, calceolarias, heaths, &c., all of which, at present, look healthy and well. The pathway goes along the back, with a door at each end, by which means the plants can be examined be the weather what it may, which is a decided advantage over the ordinary sort of pits, where the lights have to be removed for that purpose; also the ventilators in the walls preclude the possibility of damp lodging beneath. The plants stand on a platform of rough boards near the glass, and are plunged to the rims of the pots in river sand. This is the best material to plunge pots in I have yet tried, being moist, cool, and clean, and worms cannot run into it. This practice saves frequent watering, which is a great advantage in a pit of this sort, as the less water used the less chance there is of damp accumulating; for when damp is once generated it is not so easily dried up again in moist or cloudy weather. Under the platform are stowed away pentstemons, salvias, fuchsias, and such like things, for bedding out in summer.

The general stock of plants mentioned in the former communication is still extending. There is also here a quantity of the Himalaya pines.

The garden (independently of the kitchen ground) is about five acres in extent, and has originally been laid out, in the Dutch style, as a kitchen-garden, with broad main walks, which are still retained, and taken advantage of for effect, as will be seen below. The kitchen crops have been removed, bit by bit, to give place to flower borders, turf glades, and other ornaments, and a more subordinate place assigned to this department, along with the framing-ground, hardy pits, &c., behind the walls at the north and east sides, which is well protected from northerly gales by a rising ground covered with forest trees.

Taking the above as a preamble, we will now enter the garden gate. On the left is a border facing the south, with a wall behind, which last season was planted with three rows of dahlias, according to their heights. This border, when the plants were in bloom, had a most dazzling effect. It is now planted with rose stocks, to be worked in summer with choice kinds; and pillar or climbing roses are planted against the wall. On the right is the Dropmore flower-garden, spoken of in the former communication; at the end of the border is the stove; further on is the camellia-house, occupied chiefly with camellias, a few tall New Holland plants behind, and azaleas and heaths in front. Before this house is a grass glade; on a circle in the centre stands a large horsechestnut, which affords an agreeable shade for a seat in summer. Interspersed through the glade are several circles of rhododendrons (the circle is a favourite figure here), rustic vases, and single plants of juniper, forming a very agreeable whole. Further on is a border of *Lílium* tigrìnum ; on the opposite border, *Lupìnus* polyphýllus. At right angles to this are borders of common roses, right and left, terminating in an oblong sheet of gravel, whereon stand two large beech trees. These trees form an excellent shade for a luncheon party, for which the oblong was designed. To the left of this, by a winding walk, is a small terraced flower-garden, in the face of a sunny bank. On the left of the walk is a bank of rhododendrons, on the right a mass of the smaller periwinkle, which is thriving in mere sand, under two large elm trees. Returning from this and passing along the north wall and kitchen-garden gate, we come to a main walk parallel to the one with the rose borders. After passing under some shady trees, we come to the end of the pæony border, which is about 300 ft. long by 20 ft. broad. Behind this is a hedge of common furze, then a pathway, and afterwards a row of *Cèdrus Deodàra*, alternate with Portugal laurel. In the border there are three rows of *Lupìnus* polyphýllus of different varieties; then two rows of varieties of herbaceous pæonias; and in front two rows of the pretty little Aquilègia glandulòsa. This border, when in bloom, is perhaps the most showy thing in the garden. At the end of this, to the right, is a booth for the flowering of calceolarias, geraniums, and other summer plants. This booth was devised as we were not able to show off the plants to advantage in the houses, owing to their being so crowded; and it was found last season to answer admirably. The booth is the same size as the tulip awning, viz. 50 ft. long by 13 ft. broad, so that the tulip canvass, which is fitted on rollers (on Mr. Weeks's plan), goes on this when it comes off the tulips. The booth I shall here describe. It is merely a skeleton shed, with posts, rafters, ridge bar, and wall plate, and movable wooden shutters for the sides, made of very thin deal, with half-inch openings between the boards to admit air. The inside is fitted with a stage of two shelves running all round, and a flat top. The pathway also goes all round. The ends are boarded, the same as the shutters, in which are the doorways. The subdued light through the canvass shows the plants to much advantage, which you have no doubt observed in Chiswick show, or other places where plants are exhibited in a somewhat similar way. We now return to the greenhouse and vinery, heated by our hot-water apparatus, on the level principle; at the west end of which is a mass of hollyhock; at the east end the heath-pit described above, backed by a plantation of young fruit trees, which forms a small orchard. In front of the vinery is a grass plot, with an oval in the centre filled with rhododendrons and a Magnòl*ia* purpùrea.

Several alterations and improvements are in contemplation, the principal one of which will be carried into effect so soon as the weather is sufficiently open, viz. planting the different sorts of the Himalaya pines at sufficient distances along the main walks, so that, some time hence, they will form pine avenues; the borders, walks, plants, &c., to be left until the pines form sufficiently attractive objects to dispense with them.

In the above rough sketch, joined to my predecessor's communication, will be found the leading features of Dalvey garden, which I now submit, with the permission of my most worthy employer; than whom a more devoted admirer of Flora does not exist; who lives on and loves his native ground; who encourages horticulture in particular, and all rural affairs in general, to the utmost of his power. Would that more of our landed country gentlemen were of the same mind! Then would they not only live on, but take an interest in, their hereditary possessions; giving employment to the mass of the population in the improvement of their estates, to the enriching of themselves and future generations; banishing our now proverbial poverty from the land, and spreading happiness and comfort through the length and breadth of our now over-populated country. Then would that money be spent among us which is gained on the soil, but which at present is drained off to our more favoured neighbours.

Dalvey Gardens, Feb. 1. 1843.

Art. VIII. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By James Barnes, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 368.)

Letter XVI. *Culture of the Potato. Mismanagement it is subject to. Cause of Curl and Dry Rot.*

I will now give you my opinion on the culture and growth of that invaluable vegetable the potato; the abuse and mismanagement it is subject to; the cause of curl, and of that enemy the dry rot, &c. &c. It may be thought by some that I know more about eating a potato than about the proper method of growing them; and certainly the art of cooking them is a greater trouble than growing them, about which I mean to say no more than I have myself observed. I hope it may be useful to some. I shall give my honest opinion, and facts are stubborn things. I have had considerable practice in growing potatoes in pots, in cellars, in sheds, in pits, in frames, in hothouses, hooped and matted in the open ground, in borders in the open garden, and in the open field. I have practised in all these ways for several years; but I do not pretend to say that my methods are superior to any other person's; one thing I can say, that no person has ever beat me yet at any exhibition of early frame potatoes; but I do not wish to boast.

Now the greatest fault I have always observed is in preparing the seed; how can you expect to have a good crop of potatoes if the seed is bad and has lost its virtue? For instance, I have often seen, at this time of the year, potatoes hurried out of the ground, chucked together in large heaps, or clamps as they are called in some places, wet and dirty as it may be. I have many times seen those heaps allowed to heat, and the steam passing from them as if from a dunghill; of course that must be wrong. I have thought, for many years, that the steam, or reek, which passes off must be so much virtue lost. I have seen these very heaps kept for seed, and allowed, in the spring of the year, to grow all together in one mass of shoots and roots, and to become so hot in the middle of the heap that you could scarcely bear your hand in it: the hotter they get, the faster they grow; and the faster they grow, the hotter they get: then perchance they get moved, and the shoots are pulled off to give a check, to keep them from growing. Can such potatoes as these be either fit to eat, or in a proper state to plant? My opinion has always been that the principal virtue is thus lost. But, notwithstanding, they are planted again, and if cut, which is the usual practice, they perhaps lie about for several days after, sometimes for weeks; and then are put into the ground after making what is considered a good preparation for it. If it comes on very wet weather, a great many of them slop away, as it is called in Devonshire, and the remainder become weak, and look spindly and thin all the summer. If it should be a hot and dry time when planted, and the weather continues dry for some time after planting, of course they get dry rot, which is plain for anybody to see. I have seen this hundreds of times in different places, and have often pointed it out; but nobody would ever admit it was their own fault: it was either the fault of the ground, or of the season; *they* had done everything they could. According to my observations, my opinion is that the *curl* is principally occasioned by using imperfect seed that has not been sufficiently ripened; such, for instance, as late-planted potatoes: many select them because they are not fit to eat, and, therefore, think they will do to plant. An early frost having come, and cut them all down before they have got half their natural growth, it makes them so watery and waxy that they are not eatable, and, therefore, they bundle them close together somewhere to give them a sweat; and think they will then do for seed.

In planting potatoes, I have for many years observed that three parts out of four are planted too late, which is a very great disadvantage in more ways than one. First, the seed gets exhausted; 2dly, a considerable portion of the most valuable part of the season is lost; 3dly, if it should set in a dry summer a great portion of the seed is lost, and what does spring up is only weak. If it should set in a wet summer they slop, and what remains does not ripen. My system is to plant all seed whole; neither large nor small potatoes, but a middling size, from the size of a pigeon's egg to that of a bantam's. When they are first dug up they ought to be sorted for that purpose; and they should be exposed to the sun and air to harden; and, when put away, laid in lofts or on shelves, or in places where they will neither grow nor get heated.

The greater part of the potatoes I have seen planted in Devonshire has been done too late by six or eight weeks; and, if it were not for its beautiful climate and soil, what could they expect to get, as the preparation they make is but poor. In the first place, generally speaking, they plough the ground only to the depth of 4 or 5 inches; I think that is not doing much towards it: 2dly, the earth between the rows does not get half-hoed, nor stirred about enough, after the potatoes are up. My own opinion is fully made up, that the ground should be broken up deep, stirred and worked about in every possible way (particularly in dry weather), for every thing that is planted; the best manure is that supplied by the atmosphere, without which nothing can thrive. I do not mean where the subsoil is barren and unfit to turn up on the top of the other; but, at all events, break it: even if you let it lie where it is the atmosphere can penetrate and the water can pass through freely; but neither can do so, except you keep the earth open. For instance, if you go to any wood or hedge-row, and grub up trees that have sprung up naturally, without the assistance of man, you will there find the nature of the earth is porous; partly from roots decaying, and partly by moles, mice, worms, and insects working through in all directions, which, of course, allows both air and water to pass through in its natural way. Why should we, under pretence of cultivating and assisting nature, puddle and trample the earth for four or five inches on the surface, to stop up all the pores? It seems strange, but I am sorry to say I have seen it so, and so it is likely to continue. I have never had the pleasure of seeing but one subsoil plough since I have been in Devonshire; and what gave me pleasure did not do so to others. I laugh to think of the many curious remarks I heard made on that "ugly plough," as it was called; they were certain it never would answer hereabouts.

Whilst I think of it, I must tell you how they get up their potatoes in Devonshire, which, I think, will make you laugh too. They do not take them up with a fork of any kind, but have what they call a "tibble;" that is, two bills, what you would, perhaps, call a mattock. I have always heard it so called everywhere but in Devonshire. What we call a fork, too, they call a *pick*. Well, they go into the garden with this tibble and a maun (they call a basket of any size a maun); they thrust this tool amongst the potatoes with all their might, the same as we used to do at Norwood amongst the oak stubs in clearing the woods. As soon as two or three potatoes are rooted out, they let go their tool and pick them up; then taking hold of the tool again, as before, they root out two or three more. This is their manual of grubbing up potatoes: in wet bad weather you may guess they lose nothing by the job; for they and their tibble are besmeared all over with slub. I think there should be some fine enforced for robbing the fields of so much good earth. I have often asked them why they did not get proper potato forks, and have told them that they would take up a larger quantity, and in better condition; and that they ought to have some to fork out, others to pick up, and bag: but they always replied that it would never answer in this part of the country, and that a man could get up a larger quantity with the tibble; though they acknowledged they had never tried my way, or used any kind of fork, but had seen them ploughed out.

I omitted to observe in the proper place that when potatoes are allowed to grow in a shady situation, under hedges or trees, they do not come to proper perfection, and are mixed with the others which were grown in the open field, which accounts for some being found waxy or watery amongst the others when cooked; likewise in the next season, when planted again, for finding a few in one row and a few in another curled.

As I have before observed, all potatoes that are meant for seed should be ripe, and hardened by the sun and air before stowing away; that they should be kept in an airy dry situation, and never allowed to grow until they are planted out, under any consideration; that a thoroughly good winter fallow should be made, and the ground well broken up at this season of the year, and laid as rough as it can possibly be made, for the sun, wind, and frost to penetrate through it. Any good stable-dung, cow-dung, dung from the pigsties, or any other good manure, will grow potatoes well, if the ground is only properly prepared, and thoroughly sweetened with the atmosphere; taking care to plant them in good time for general crops. I like to have them all in between the middle of March and the last week in April.

For the growing of potatoes *in pots in hothouses*, &c., to have them good in January, they should be planted the first week in October in a 60-sized pot, placed at the back end, or in any part of the hothouse where you can put them thick together; as fast as they get up and are three inches high, take them out into a colder place, such as a vinery or a peach-house. When you have a quantity in readiness, fill as many good-sized pots as you can spare; get some good, open, rich, sweet mould; fill the pots three parts full, not sifted but rough; place them where you intend them to stand in rows. A peach-house is the best place; in one where you intend beginning early, you get the first crop off before the leaves of the peach trees shade the house at all. In planting them into the larger pots from the sixties, pull off all the shoots except the one that is the strongest; never allowing more than one shoot to each plant at this season of the year: put three or four plants into a large pot, according to the size. Be careful never to water with cold water, or they will come on very slowly; also be sure you do not over-water them, or the flavour of the potato will be lost; a little manure liquid, with some soot in it, once, is a fine thing. When fit to earth up, fill up the pots; and when they have made their growth, leave off watering them altogether, if you wish to have a good-flavoured and dry potato. If you have not small sixties to spare, use pans, shallow boxes, or an old basket, or lay them inside of a hotbed, either in a frame or in a hothouse, which will hatch them quite as well.

For growing them *in pits or frames*, I make a very slight hotbed with a few leaves and rubbish (for bottom-heat does not suit a potato by any means). Get some good, prepared, sweet, open earth, and put it all over the bed 12 or 14 inches deep; have your seed all ready hatched as before recommended; turn them all out as near of a size as possible, taking care to pull off every shoot but the strongest one. With bestowing this care and attention I have had as fine crops this way as I ever saw out of doors. I always grow the Albion, or Dwarf ash-leaved Kidney, for all early purposes; having proved it to be the best sort for that. I have now at this time my third crop planted: the first is all up as strong as on May-day; the second coming on; the third just planted; and so I continue to plant again into the sixties as fast as I turn the others out.

I hatch the whole for all early work, likewise for hooping, and the first turned out on the border; they will stand in any corner out of the way to hatch. In *hooping* or sheltering potatoes with mats or canvass, I make it a rule to throw out 4 ft. in width across the garden where I take up my asparagus for forcing, throwing the earth out right and left to sweeten, to the depth of a foot; then the dung and leaves which come away at that season of the year from the sea-kale, that has been in use all the winter, is put into this trench about 12 or 14 inches thick, and the earth thrown back over it. I next take the scarlet-runner sticks, and lay them on and across; tie them to the height of about 12 in. above the bed, and then turn the potatoes out as above recommended, all ready hatched either in pots, or any of the conveniences which at that season of the year are plentiful, such as pine-stoves, vineries, cucumber and melon beds, &c. It is astonishing what time you gain by having them always ready hatched: not only that, but it requires so little of any sort of fermenting materials; only wanting a very slight warmth, just to start them at first going off, for potatoes do not like bottom heat. By hatching a few to turn out into a sheltered situation in the borders or elsewhere, and by following the practice I have recommended, I find I have always a plentiful supply of good new potatoes all the season, until such time as they come naturally out of doors.

To prepare for the *out-of-door* potatoes, it is only necessary to do as I have before stated. Get the ground well-worked, sweetened, and manured, and planted in the proper season with whole seed that has neither been heated nor allowed to grow before planted. If what I have recommended is attended to, the curl, dry rot, or sloping, will never trouble you; but you will be satisfactorily repaid for all the labour and expense you have been at to bring them to perfection.

To grow them *in cellars or sheds* is nothing more than procuring a quantity of last year's old potatoes in August and September, and stacking them in rows on shelves, or on the ground with a quantity of old tan or light earth between them, when numbers of young potatoes of a bad quality form themselves. It is not much practised now by the London market-gardeners, but it was twenty years ago, when the London purchasers soon got tired of them.

To *cook a potato* well, the following is the best and most simple method I know of. An iron saucepan is the best for cooking them in, as the copper ones, if not quite clean, are apt to be dangerous. They should be dressed with the skins on, and not be drowned with water; done quickly, and the water poured off directly they are about done, shaking a little salt amongst them, leaving them near the fire, with the cover of the saucepan loose, so as to admit of the steam passing off. This will insure you a dry mealy potato.

Exchanging seed, one neighbourhood with another, is very essential; and a very beneficial improvement will be obtained thereby, both in crop and quality. All seed should be changed once in two years; not only potatoes but all sorts of corn and vegetables; the benefit of a general system of exchanging throughout the whole country would be very astonishing.

I have known, for some years, that it is the opinion of various persons that over-ripeness in the seed potatoes is the cause of their *curling*. Of this I have no doubt whatever, although in my own practice I have had no proof of it; having always made it a standing rule to take up all kinds of potatoes before getting over-ripe, that is, as soon as they are moderately ripe. I have had practical proof that, if the unripe and imperfect seed potatoes are planted, they cause the curl; therefore, it appears quite reasonable to me to hear of over-ripe seed potatoes getting the curl, as well as those which are unripe. The former curl because they have lost part of their properties and substance; the latter curl through not possessing these properties and substance at all. The same is the case with all kinds of fruit, either under-ripe or over-ripe; of course, either way, it does not possess its full properties. Corn over-ripe, every one knows, more particularly wheat, loses a considerable quantity of its properties: with all kinds of seeds the effect is the same; of which I, myself, have in many instances had ample proof, which, at present, I will not enlarge on.

In a short time I think of giving you a rough sketch of my management of the kitchen-garden, cropping, trenching, hoeing, &c. &c.

Bicton Gardens, Nov. 7. 1842.

P. S.—*June* 29. 1843. Having met last week an old experienced farmer, I asked him how his potatoes were looking this season. He informed me that they were very indifferent; that he had been a considerable distance about the county, and found those of many persons much worse than his own; that many acres were ploughed up as a complete failure; and that in many situations he had observed the missed places planting with fresh seed. My own opinion is, that planting and filling up with seed more exhausted than the first is of but little use; for this reason, if any of them should grow they will be much later than the others, and spoil the sample, particularly if they should be for sale. I should recommend calculating on the crop; then, at certain distances, taking up with a spade the plants of so many rows, and planting them in the vacancies, right and left, as they are taken up. The cleared ground could then be planted with other potatoes, or sown with turnips, to be pulled off early. No vegetable that I am acquainted with transplants better than the potato, if properly done; it is the means of checking the over-luxuriance of the stalk, and increasing the size of the tubers.

I asked the above-mentioned farmer what was the principal failure or disease so prevalent amongst the potato crops, and the cause of it. The latter he could not account for otherwise than that it was his opinion, and that of most others he had conversed with, that it was through the wet unkind season; although, to their surprise, the dry rot was very prevalent, as well as sloping, or wet rot. Besides, he says, there is another failure very prevalent this season, that much of the seed produces underground tubers without shooting up, or producing any stems. "What could be the cause of that," says the farmer; "if not the wet cold season?"—"Exhaustion of the seed before planting," I answered, "is the cause of each disease you complain of."—"How can that be," asked the farmer, "when last autumn was one of the finest I ever remember for ripening the potato crop; so that many persons' potatoes were ripened and taken up several weeks sooner than usual? Besides, we had a very mild favourable winter; no frosts to injure them in any way."—"The more likely to get exhausted," I replied, "by heating and growing."—"Very likely, very likely," replies the farmer, "I am sure; though I never once gave that a thought, although we have suffered from dry rot and sloping for years, hereabouts. On second thoughts," he says, "that cannot be the cause of all three of these diseases: dry rot, sloping, and tubering under ground without sending up stems."—"I am perfectly satisfied it is," I replied. "The dry rot affects those most from the middle of the heap, that have been the hottest. Those have gone sleepy, dead, and *druxy* [? drowsy], like an over-ripe apple, looking fair to the eye although perished; and they are to be found amongst old potatoes, for several months in spring and early summer, on many people's tables, spotted, black, and flavourless, amongst others tolerably good. The sloping, or moist rot, is caused by the same; but, probably by their being nearer the outside of the heap, the steam and moisture cause them to grow freely, or, I should say, shoot in the heap freely. Thus potatoes that were good in autumn are found in spring to be waxy, watery, and black. Pulling the shoots off in spring, and exposing the seed to the atmosphere, which is very frequently done with the seed potato when it is considered safe from frost and they are are not required to eat, are the means of producing tubers without stems; and I will give you my reason for forming that opinion. When a boy I was set to clear out the bins in a potato cellar. I particularly noticed in one bin, near a window that had been standing open for a considerable time to allow the air to draw through to dry and sweeten the cellar, and where the morning sun shone in, that the few old potatoes there left had mostly formed plenty of tubers, and but few shoots. I well knew they had their shoots and roots pulled off two or three times in the previous winter and spring. Boy-like, I collected some of the largest of the young tubers, took them to some of the garden men just by, telling them there were larger young potatoes in the cellar than they had out of doors. On going to London afterwards to follow my business at market-gardening, I observed new potatoes were produced from potato cellars before we could grow them by forcing. It was a practice in some of the gardens to stack a quantity in old tan or light earth, in cellars or sheds, to cope with the others; but sometimes they grew all in one matted mass of roots and shoots. In my efforts to get over this difficulty, I remembered the potato bin; and by allowing them to grow a considerable length before making use of them, pulling off clean all roots and shoots, and exposing them to the sun and wind for a time, they answered expectation tolerably well, only that a large quantity was always lost with dry rot and wet rot, instead of producing tubers.

I am perfectly satisfied, from practice only, that were the seed properly sorted out in autumn, and prepared and taken care of through the season afterwards, as before recommended, we should hear of but few complaints about any disease amongst the potato crops: "prevention is the only profitable cure."

Hearing so much of disease in this valuable vegetable this season, and observing questions asked in the *Gardener's Chronicle*, and remarks made in that and other papers, I have been induced, in my humble way, to state the above, which I have entirely learned by practice. I also feared that I had not explained myself sufficiently, in the foregoing letter, on the subject of potato-growing.

LETTER XVII. *System of Kitchen-Gardening. Culture of the Strawberry, Asparagus, Sea-kale, Celery, and Cauliflower.*

IN my last I promised I would give you a short account of my rough *System of Kitchen-Gardening*, which, I am sorry to say, is still in a very imperfect state; not one job having been done in Bicton kitchen-gardens yet to please me. They, as you observed when here, are on a level (an artificial level though), well supplied with water all the year round, from a beautiful stream which runs through it. The ground a sandy loam; the subsoil a body of dry, coarse, red sand, inclining rather in some places to a sort of rocky flat stones. This garden was formed at an immense expense, having thousands of loads of loam to make the borders, &c., and yet in places the sand is still near to the surface: but since you were here I have got home about 500 yards of beautiful loam and marl; intending to make a good preparation for every tree that is planted, and to wheel a quantity of it on every piece of ground, as the crops are cleared off, giving the ground a good trenching, breaking the subsoil with a strong fork and leaving it where it is. I make it a standing rule to return as much as possible of the refuse of vegetables back to the ground again, by trenching down cabbage leaves, broccoli stumps, pea haulm, and all such articles, in a green state. The benefit to the soil is great, and the saving of labour considerable; for I have seen much time lost in clearing a piece of ground of the vegetable rubbish on its surface, previously to trenching.

Now the kitchen-gardening business, before I came here, had been done in a very different manner from what I had been in the habit of seeing done and practising myself. The tools the most paltry I ever met with. It is some trouble to get a Devonshire man to use a spade with an eye to it. Their spade (which no doubt you noticed when in this county) is an ugly, home-made, heart-shaped bit of heavy iron, with a great socket to it; and they form the handle of it themselves, by cutting a great, heavy, lumbering stick out of a hedge, 6 or 7 feet in length, about the size of a Kentish hop-pole, so that they can always use it without bending their backs; although the generality of men in Devonshire are a shortish race. However, this long-handled spade and the homespun tibble are almost the only tools you can get them to use; and they have the ugliest-made wheelbarrow too, the most awkward and cumbersome that can be imagined. Any kind of improved tool they appear to dislike; so that you need not wonder at our being a little out of order. For instance, a few days since, a load of potatoes was wanted from the field, for the use of the house. I had already had two potato forks from Essex. Some of my men saw them, and asked my foreman (who is a Scotchman, and had seen such forks before) what use they were of; and when he told them, and added he expected I was going to teach them how to take up potatoes, they laughed, and said that I should find I was mistaken, for such things would not answer hereabouts. I took a couple of my forks, and a boy to pick up, and I set to work myself, and told one of my men to take the other, and look at me, and follow on digging with it; and they all confessed they never saw such a quantity of potatoes turned out in so short a time before, but they still did not exactly relish taking them up in that way.

I found their system of working in the kitchen-garden was puddling it over; with scarcely depth enough, when digging, to cover an earwig. They had amongst them but one bit of a spade the length of my hand, and two long-handled spades, so worn that there was no fear of the men over-fatiguing themselves by lifting too great a weight; one two-pronged fork with a broken handle; one old drain-hoe; and two old Dutch hoes: and this was about the stock of tools I found in Bicton kitchen-gardens, and I thought them the most miserable lot I had ever met with. However, I had fortunately brought a set of my goose-necked hoes with me; but I could not persuade any of them to use them, for weeding was the order of the day, and my hoes appeared to them the most ridiculous things imaginable. I wondered how the work was done with such tools; but soon found hoeing and raking to keep a smooth surface formed their method (for they had an old rake or two), and digging shallow and breaking fine, picking out all the stones (the very thing I thought the ground wanted more of). The strawberries were old, and all run together into a mat, which is the surest way to keep up a stock of different kinds of weeds for seed, so that they must remain in the garden; it likewise was a good harbour for slugs and snails to breed in, and for the birds to feed and hide themselves in. I soon found that when showery weather set in everything was devoured by slugs, which the men told me it was a wonderful garden for; and they accounted for it by saying it was a newly formed garden taken out of a field. I could not agree with them, so I set to work and destroyed an amazing quantity in a short time by the following method. Getting some fresh grains from the brewhouse, I went round, inside and out, dropping about a table-spoonful of them as I walked, at small distances in all directions, at dusk in the evening; I then went round with a pail of fresh-slacked lime from nine to ten o'clock the same evening, and found them heaped on each other like bees when swarmed: by dusting them with lime, I killed those that were so collected. I sent a woman or boy round with a pail and trowel the next morning, to take them up, and bury them. It was astonishing what a quantity was destroyed by following this method closely for a month or six weeks: but it is the best plan to keep slugs away altogether, which is easily done by trenching, ridging rough, and continually hoeing and stirring the ground, which is congenial to all vegetation, but destructive not only to slugs, by turning them and their broods out, but to every other sort of vermin, which it lets have no peace, and either destroys them altogether or drives them away, as they do not like such usage.

No *strawberry plants* ought to be planted less than 2 ft. apart each way, and never allowed to stand more than two years, taking care always to keep all runners cut closely off; by these means there is a greater weight to be obtained, finer fruit, and better flavoured, as the sun and air can circulate more freely amongst them; and mulching them with clean short grass, just as they come into bloom, keeping them clean and the ground moist, makes them flourish. If they are obliged to be watered, it must never be done with a rose on the watering-pot, but by pouring round the roots from the spout, so that they get a good soaking without wetting the fruit; for it spoils the flavour of the fruit if it is over-watered. The best-tasted and most prolific strawberries that I know of are Myatt's British queen, Myatt's Eliza, Myatt's pine, Downton, Keen's seedling, and the old true Scarlet pine. I find that the plants that have been forced, by being turned out as soon as done with into a good bit of ground well prepared, always make fine stools for the next season, or bring a good crop the same autumn, which is found to be very useful. Any good holding loam will grow strawberries, and bring them to a good flavour, if well prepared and sweetened by the atmosphere first; and some good rotten dung worked in amongst it, and a little soot sprinkled in amongst them and hoed in in the month of April, will make an astonishing difference in the quality and flavour of the fruit; and, if the ground has become steely* and unkind by heavy rains, sow some charcoal dust amongst them, and hoe it in, which will soon purify the earth, and improve the crop wonderfully.

Asparagus, to be grown well, should have the ground well prepared, broken up to a considerable depth, and well manured, with some sea-weed or salt worked into the ground; which should be trenched in autumn or early winter, and laid in rough ridges so that the air, sun, and frost can penetrate through it. Forking the ground at every opportunity with a strong fork or pick-axe on every frosty morning, routing and turning it about when frozen, will not only sweeten and mellow it, but will kill all slugs and other insects. Never put in your asparagus plants until April; when the young plants are grown or shot 2 or 3 inches they always do best: if planted before they begin to grow, and the weather should turn out cold and harsh, oftentimes there will be many plants that will lie dormant and not break at all, which causes so many blanks in the beds. If you intend sowing the seeds, do so a month earlier in drills 2 ft. apart; which should also be the distance at which to plant them; thinning out the plants sown from 12 in. to 18 in. apart in the drills; never putting more than two rows of plants in each bed of 4 ft.; and leaving from 2½ ft. to 3 ft. alley, which is essential, and is a good shaded situation in hot dry summer weather to grow the late cauliflower and Cape broccoli. The system of covering the beds with earth to such a depth as is done by the London market-gardeners early in the spring I do not approve of, always considering it completely in opposition to nature. They say they cannot get a sale for it amongst the London people if it is not a considerable length: but of what use is it? The London people cannot eat those long, tough, hard stalks; for after all only the very top can be eaten. I always find that noblemen and gentlemen's families are most fond of asparagus in its natural beautiful green colour, and just long enough for the cook to tie into a bunch; then you do not rob and smother the plants, but have asparagus fit to eat, tender, and high-flavoured. It is one of the most wholesome and delicious vegetables grown, but wonderfully abused.

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* Steely. Clayey soil that has been poached when wet, and when the water cannot get away, is, when dry, difficult to penetrate with the spade or hoe, and in that state is said to cut out steely, or leathery. When wet it is shining, close, and tough, like liver; and when dry, hard, steely, and unkind, like iron.

Sea-kale should have the ground prepared in a similar manner to asparagus, with salt and sea-weed, which it is very fond of; planting one-year-old small plants that have been saved on poor ground, the rows 2 ft. apart, and 2 ft. from plant to plant in the rows, not two or three together as is generally done; for, if the preparation is good, one plant is always sufficient. It is as beautiful and delicious a vegetable as any that is grown, for winter purposes, if grown and blanched as it ought to be; but it requires time and attention to bring it properly to perfection. If it is hurried with too much heat, it is spindly, weak, and without flavour; if too slow, it is as bitter and worthless. In my opinion, it is in its full perfection when from 4 in. to 6 in. long. When cutting it, take care always to cut the crown just under the earth: this should be particularly attended to. If the crown of the plant is left above the ground to be exposed to the frost after it has been forced, it causes the canker so generally complained of amongst sea-kale; but take care always to leave a little litter or leaves amongst it, so that the frost may not penetrate to the crown, and then you will have healthy and wholesome sea-kale. But it is plain enough that, if it is otherwise, it is our own fault, the same as it is with the seed potato.

Celery is one of the most wholesome and useful of all vegetables, but subject to mismanagement to a great degree. In the first place, it is generally sown too early. The main crops should never by any means be sown sooner than the first or second week in April, and then on a very slight hotbed, covering a part of the bed with a light or hand-glasses, by which means you get plants of two different ages; taking care to sprinkle your beds and plants, when up, with water a little warmed. Keep the earth stirred often with a pointed stick to keep it open. As soon as the plants have two leaves besides the seed leaves, prick a quantity very carefully on another slight hotbed. If you want to grow celery extra large, then prick it again in about 16 or 18 days; then the third time, leaving the same interval between. Keeping them watered with good water, and hoeing them often, will be the means of having strong well-rooted plants: but they must not be allowed to stand, after the third time transplanting, more than 10 days or a fortnight, or the fibres will have spread such a distance that they will be subject to get broken off when taken up; which should be done with great care, with a trowel, with all the earth which will adhere to the plants. I must here make one important remark, which is, in planting in any stage of its growth never plant deep; always leave the collar and seed leaves above ground, and, as you must have plenty of room to plant it as high as you please, do not thrust your celery plants down into the cold gravelly or sandy subsoil beneath, for if you do it will never be good. You cannot possibly have good celery if you sow it too early, and then allow your plants to stand in the seed bed until it is drawn up weakly and spindly. I have seen some transplant it, and allow the plants to get again drawn up weak and naked-rooted, and then set to work in good earnest, because they saw a neighbour do so the day before, in planting his celery. So they dig out a trench 1 ft. wide, and about the same in depth; put in some dung; turn up the subsoil amongst it, or on the top of it, that possibly had never been moved before; and then thrust into this trench their long weakly plants a good depth, as it is called, to keep them up; they next earth them up early to smother them more, and expect to have good celery from this management, and when they find it fail, put it upon the soil or the season. My system is simply this. I always trench every bit of spare ground, and throw it in ridges as soon as any crop is off. Now many people will say: "We have not got time to do that; we have not strength enough; besides we are forced to keep the ground cropped to that degree that there is no chance of trenching:" but I contrive to find time in some way to trench all spare ground; by which means I always have a bit ready for successional crops, which is planned in my mind from time to time. I take my line and spade to one of those pieces of ground, measure it out, at least 6 ft. from row to row, stretching the line from end to end across the ridges, and merely shovel out a shape of a celery trench 2 ft. wide; if the ground has not previously been well manured, I of course shovel out the trench something deeper, to admit of manure, which should be good, strong, tolerably rotten dung of any kind. I then take the plants up carefully with a trowel, with good balls of earth; and plant them, if required extra large, from 12 in. to 15 in. from plant to plant, if of the usual size from 10 in. to 12 in.; taking care never to plant deep into the subsoil, or to put the plant below the collar, for I would sooner see half of the roots exposed, than the eighth part of an inch of the heart buried. In earthing up, never by any means begin too early, for by that plan much of the celery gets considerably injured: and, instead of muddling it about with earth ten or twelve times, once or twice, or at most three times, earthing is quite sufficient to bring it to proper perfection. Every body knows that celery is fond of plenty of water, likewise of manure liquid: but in hot weather never water it over-head with a rose on your watering-pot; but pour abundance about the roots out of the spout, with a brushy stick put into the spout of the watering-pot, so as to cause the water to come out more gently, and not wash out the roots; using a watering-pot at the same time in each hand, it keeps a man better on the balance.

To combat that destructive insect and rust which have attacked and destroyed so much celery of late years, I find there is nothing equal to soot dusted all over the plants when the leaves are moist, so that it will adhere. For instance, I had the whole of the celery attacked in these gardens last September, so that to all appearance it would be scorched up in a few days. It did not happen to be showery weather at the time, so I took the garden engine and gave it all a good washing, having a man to follow me dusting the soot all over it. Having thirteen rows in the garden, I dressed twelve of them twice, which perfectly cleansed them; the thirteenth is now remaining there scorched up from end to end as if it had been fired, without one head fit for use. I mean to allow this bed to stand for a time, that any gardener who may happen to call to see me may be convinced of the correctness of my remarks.

I have worked amongst many acres of celery: 13 acres are the most that I have cultivated in one garden during one season; but I have seen three crops taken off the same piece of ground in that time; and a great deal of it twice cropped with celery in the same season, which is of rare occurrence except in a London market-garden. Of course the plants must be well prepared and strong; and done justice to in planting with a good preparation: but a London market-garden is the place to see all things well prepared for.

Cauliflowers, as I have before told you, I make a point never to sow sooner than from the 18th to the 25th of September; sowing the seed in boxes, frames, or pans, close to the glass. The last of my late cauliflowers I sow about the 15th October, in pans in a little bottom heat, and always make it a rule to prick at this season of the year in thumb pots first, having at this time plenty of spare pots that flower-garden plants have been turned out of. I keep them shifted on in some old melon mould until February, when the plants are become very strong; making it a rule to trench, ridge, and manure my first-cleared celery ground, for the purpose of placing hand-glasses for the first crop. When prepared, if the ground should be wet and cold, I take care to throw out a sort of trench the width of the hand-glasses; mark out a place for each glass; throw out a little of the earth where each glass is to stand, and put in a small quantity of dry dusty mould, old dry mushroom bed, or such like; which I always take care to have ready prepared in the corner of some shed, or covered up with straw mats, which are made by the men in rough weather. I always find in winter plenty of dry dusty rubbish handy and useful for saving many things from cankering, as well as for saving cauliflowers from getting black legs; which every grower is acquainted with, and by which disease many crops are lost. When the hand-glasses are prepared as above, I turn out about four of these large plants under each glass, keeping them well aired at all suitable times. They grow remarkably free, let the weather be what it may. If the weather proves dry in March, I get manure water prepared, put into it a quarter of a pound of nitrate of soda to one hogshead of tolerably strong cow-dung water; taking care to add to it a few gallons of hot water to make it a little warm, which well repays the trouble, for they will grow through the cold March winds like as in May, and fine cauliflowers I always get early in April. This season I find I did not have any account kept of cutting them until April 15th; but, by growing and shifting some along until I get them into No. 8. pots, and placing them for a few weeks in a vinery that is just put to work, or a peach house, I have had cauliflowers early in March. They are found very useful at that season of the year in every family; as they come before the spring vegetation begins to do much, and the winter stock is getting exhausted. I continue to sow just a pinch of cauliflower seed about every 20 days through the season, from the first week in January until the 15th of October; and I have never been without cauliflowers one day since the 15th of April last. I have at this very time cauliflowers as close, fine, and white as they were in May last, with every appearance of having them as good until January next; having 200 fine plants of different ages potted in the large pots in which I grew my balsams, cockscombs, globe amaranthus, &c., and placed in the melon pits, &c., and other sheltered corners. These pots would be doing nothing at this time of the year, if I did not use them for this purpose. It is only to get up an hour earlier in the morning to get these extra jobs done, which is good for the health and I think nothing of the trouble; it is a pleasure, and where there is a will there is a way. So, if you have no melon pits nor frames, it is always easy to throw out a 4 ft. trench right and left, and form a home-made pit; getting some of your kidneybean sticks to put over it; and covering with mats, straw mats, heath, or fern.

Bicton Gardens, Nov. 21. 1842.

LETTER XVIII. *On the Gooseberry Caterpillar.*

IN the course of my practice, I have seen in some seasons great destruction caused by the gooseberry caterpillar. When a boy, I would sooner do any job than pick caterpillars, on account of their strong disagreeable smell, and the tediousness of the job. In the year 1817, in the garden where I was then employed, the gooseberry bushes were attacked by such multitudes of caterpillars, that some were very soon stripped entirely of their leaves. All hands were put to picking them off, and other remedies were tried. At the time, I saw a heap of soot in a back yard, which the sweeps had that morning cleaned out of the house chimneys, and, knowing of a quantity of fresh wood ashes under a large copper furnace used for brewing, I took a quantity of each and mixed them together, and gave the bushes a good dredging with it when damp, and in two or three applications had the pleasure of seeing the whole of the caterpillars expelled.

The gooseberry bushes, and all the fruit trees in that garden, were covered with lichens and moss. The following autumn, it was observed, every tree that had been dressed for the caterpillar was quite clear of the moss and lichens; the remedy was therefore in damp weather in winter applied to all the fruit trees about the garden, which were completely cleansed by it. A quantity of both soot and wood ashes was collected and laid in separate heaps in a back shed on the floor, to be in readiness in case of another attack of the caterpillar the following spring.

The gooseberry bushes were attacked again the following spring, and the above remedy applied with but very indifferent success; and as they were not very numerous, and were soon picked off, no farther notice was taken of them.

I never forgot the successful application of the soot and wood ashes, and, as seasons have passed on, I have continued using it; sometimes with tolerable success, at others without any. I have often noticed the great improvement it made in the luxuriance and growth of the trees afterwards, if it happened to be showery weather. In 1841, the gooseberry bushes in Bicton gardens were attacked by multitudes of the caterpillar; and making it a rule at all times to keep soot and wood ashes by me, and having a quantity at the time in a shed, I tried it without success, and was obliged to put all hands day after day hand-picking them. They got so numerous that they attacked currants as well. In 1842 they came more numerous than ever; every thing was tried that could be thought of; all other work getting behind by attending to them. A host of boys was employed to pick by task, and some men and a woman. One batch was no sooner cleared than another was attacked: with all the exertion we could make, a great quantity of trees were completely stripped of their leaves, exposing the fruit to be shriveled by the sun.

Last autumn I was much perplexed every time I passed the trees in so deplorable a condition. It struck me all at once, one evening, that the properties of the soot and ashes were lost to some extent by lying on the floor, or possibly by getting a little damp in some way. I so well recollected, as if had happened only the day previous, that in the year 1817 I had seen it destroy and expel the whole. I recollected too that the soot was fresh cleaned out of chimneys where coal was burnt, that the wood ashes were fresh and dry from under the furnace where different kinds of wood were burnt, such as oak, elm, Scotch fir, larch, some birch, and Spanish chestnut; for I saw the brewing-men sawing and taking it from a large stack under a row of large high yew trees. This last winter, in collecting soot and wood ashes, I had it put into old dry boxes and cement casks, keeping the bottoms clear from the floor by bricks or logs of wood, and covering it down so that no dampness could get to it; and on the bushes being attacked this spring again by thousands of the black army, as my men call them, as they do also the turnip caterpillar, we set to dredging the bushes early of a morning when they were damp, or after a shower, and by perseverance we soon completely cleared them of the whole in their infant state, without their doing any mischief whatever. At the same time, through its being showery, and the rain washing it down to the roots, the bushes are so astonishingly improved that no one could suppose them the same naked starved trees. I have been perfectly convinced now, in many instances, that if either soot or wood ashes get any way damp, part of their properties or virtues is lost; for instance, if smelled to when fresh, the mixture will make the nose twinge, which it will not do after being kept in a damp place, although to all appearance it is not damp.

It is a curious fact that in the course of years I should not have given it a more serious consideration, and discovered the cause before the lapse of a quarter of a century. No doubt but many things get lost sight of, particularly different manures, through their not happening to be properly applied. Now I have discovered the cause, I can judge quite as easily by the feel of soot and ashes, as I could by the smell. Soot alone will destroy the caterpillars; but, by mixing wood ashes with it, the mixture does not fly about so much and get wasted, and it adheres much better to the trees. Wood ashes, when of their full strength, and used in damp weather, when they can adhere to the tree, will kill and clean any kind of moss or of lichen, and is the only article I ever use now for that purpose.

Bicton Gardens, June 1. 1843.

ART. IX. *List of Species and Varieties of* Rhododéndron *cultivated at Dysart House, with Remarks on their Management.* By JOHN BLAIR, Gardener there.

As suggested by you, I now forward you a list of the different varieties of rhododendrons grown here, with their times of flowering; and, in order to make the list as useful as possible, I beg leave to make a few observations explanatory of the climate, locality, and soil, in which these varieties are grown.

The flower-garden here, the property of the Earl of Rosslyn, is situated close by the sea, standing about 53 ft. above its ordinary level, and sloping towards the south-east. From its proximity to the sea, the frost is not so severe as it would be further inland; the thermometer being seldom or never below 10° in the most severe winters (1837–8), from its southerly exposure, and ranging from 80° in the shade to 120° (in 1842) out of it. However, the south-east winds need to be guarded against, not only from the intensity of their cold, but also from their violence.

Portugal laurels on the exposed side, and common hurdles interwoven with spruce fir branches on the other sides, form an excellent protection. The finest of these varieties grow about 212 ft. from high-water mark; while some of the more common kinds grow within 12 ft., and not 3 ft. above its level, with little or no shelter. The soil used in the garden is a mixture of peat earth and sand, not broken very small; the depth varying from 2 ft. to 4 ft., according to the size of the plant. However, I have been in the custom of planting them, after they have grown to a considerable size, in the woods, where they thrive uncommonly well. They form an excellent underwood, more particularly the *R.* catawbiénse var., which is very hardy, and is more able to stand the drip of trees than the other varieties. The natural soil in these woods is a black light loam; but, in some places, the rhododendrons are planted in strong soil, where they also do well.

They all require to be well watered, more particularly when in flower, which continues their bloom much longer, and causes them to push out strong healthy shoots.

The best way of propagating them is from seed, which being sown in a gently heated frame, the plants soon make their appearance, and, if properly attended to, will flower in four or five years.

I have remarked, also, that the warmer the season is, the better they blossom the following one; the flower buds being more numerous, and brought to a greater degree of maturity.

List of the Rhododendrons in the Collection at Dysart House.

- *R*hododéndron arbòreum.
  - álbum.
  - ròseum.
  - new var.
  - cinnamòmeum.
  - álbum fimbriàtum.
- Azàlea, a hybrid.
- *R*hododéndron máximum, hybrid.
  - campanulàtum.
  - campanulàtum var.
  - andromedæ*fòlium.*
  - augústum.
  - alta-clerénse.
  - azaleoìdes.
  - anthopògon.
  - Blair's hybrid, varieties Nos. 1. to 7.
  - carnarvoniànum.
  - caucásicum.
  - catawbiénse.
    - speciòsum.
    - grandiflòrum.
      - álbum.
    - magnoli*æfòlium.*
    - spléndens.
  - campanulàtum.
    - var.
  - chrysánthum.
  - Chamæcístus.
  - Cunningham's hybrids, C, E, H, I, K, L, M, N, O, P.
  - daùricum.
    - atrovìrens.
    - altàicum.
  - europæ'um hýbridum.
  - ferrugíneum.
    - hirsùtum.
      - fòliis variegàtis.
  - grandiflòrum.
  - guttàtum.
  - Glennie*ànum.*
  - Herbert*iànum.*
  - imbricàtum.
  - Knight's favourite of 1838.
- *R*h. Knight's hybrid varieties, Nos. 1. to 12.
  - Lord Caernarvon's seedling.
  - lappónicum.
  - longiflòrum.
  - Murray's hybrid.
  - multimaculàtum.
  - myrtifòlium.
  - máximum.
    - álbum.
    - ròseum.
  - Noble*ànum.*
  - nepalénse.
  - oculàtum.
  - odoràtum.
  - pulchérrimum.
  - pónticum.
    - arbòreum.
    - spléndens.
    - púlchrum.
    - fòliis argénteis.
      - aúreis.
    - contórtum.
    - frondòsum.
    - ròseum.
    - kalm*iæfòlium.*
    - flòre plèno.
    - salicifòlium.
    - ovàtum.
    - macrophýllum.
    - rubéscens.
    - nepalénse.
    - álbum.
  - píctum.
  - punctàtum.
    - ferrugíneum.
- Azàlea, hybrid.
- *R*hododéndron, Blair's seedling.
  - Russell*iànum*, two varieties.
  - Rollissòn*ii.*
  - Smíth*ii.*
  - spléndidum.
    - var.
  - venústum.

And about fifty others, hybrids, without names. In all, 109 species, varieties, and hybrids; 28 of which are not named, and 81 named.

Diary, showing the Time when those Rhododendrons which flowered at Dysart in 1842 were in their greatest Perfection.

Jan. 1.	*R*hododéndron álbum fimbriàtum	White, with red spots.
27.	arbòreum var.	Scarlet.
Mar. 1.	arbòreum	Scarlet.
10.	lappónicum	Purple.
20.	daùricum	Purple.
	atrovìrens	Purple.
	altàicum	Purple.
27.	pulchérrimum	Scarlet.
	Noble*ànum*	Scarlet.
April 1.	anthopògon	Pale yellow.
10.	campanulàtum	White.
18.	alta-clerense	Scarlet, with dark spots.
23.	caucásicum	Yellow.
	Knight's favourite of 1838 (fine)	Scarlet.
30.	pónticum arbòreum	Scarlet.
	multimaculàtum	Pale spotted.
	tigrìnum	Pale spotted.
May 4.	Glennie*ànum*	Pale pink.
8.	Russell*iànum* (fine)	Scarlet.
14.	Cunningham's hybrid	Pale yellow.
	spléndidum	White.
	Chamæcístus	Rose pink.
25.	catawbiénse	Purple.
30.	speciòsum	Rose purple.
	grandiflòrum	Dark purple.
	álbum	White.
	spléndens	Dark purple.
June 6.	píctum	White, with dark spots.
	guttàtum	White, with yellow spots.
	arbòreum ròseum	Rose.
14.	pónticum	Purple.
	spléndidum	Pale purple.
	púlchrum	Pale purple.
	contórtum	Purple.
	fòliis argénteis	Purple.
	aúreis	Purple.
	frondòsum	Purple.
	ròseum	Rose.
	kalm*iæfòlium*	Purple.
	flòre plèno	Purple.
	*s*alicifòlium	Purple.
	ovàtum	Purple.
	macrophýllum	Purple.
	rubéscens	Purple.
	nepalénse	Purple.
24.	álbum	White.
	Cunningham's hybrid, grandiflòrum	Pale yellow.
July 1.	punctàtum	Pink.
	ferrugíneum	Pink and scarlet
	Azàlea, hybrid	Pale yellow.
	*R*hododéndron, Murray's hybrid	Rose scarlet.
12.	odoràtum	Pale pink.
	Azàlea and *R*hododéndron hybrid	White and yellow
	R. ferrugíneum	Scarlet.
	hirsùtum	Scarlet.
	fòliis variegàtis	Scarlet.

26.	máximum - - -	Pink.
	álbum -	White.
30.	ròseum - - -	Rose.
Aug. 18.	anthopògon, second time of flowering - - - -	Pale yellow.

I may observe, in conclusion, that the time of flowering varies much according to the season.

Dysart House, near Kirkaldy, May, 1843.

[The above communication Mr. Blair kindly promised to prepare for us when we paid a visit to Dysart House in September, 1841 : it wås read at a meeting of the Caledonian Horticultural Society in June, 1843, and forwarded to us afterwards by the Secretary.]

Art. X. *Notice of a Collection of Spiræas, North American Oaks, Abiétinæ, and Cuprèssinæ, made in the Spring of* 1843. By the Conductor.

Being desirous of having immediately under our eye as many species and varieties as we could get of the genera mentioned in the following list, and in particular of the North American oaks, the *A*biétinæ, and the *C*uprèssinæ, in order to study these tribes in a young state, we procured from the Horticultural Society's Garden, from Messrs. Loddiges, and from some other nurserymen, plants of the kinds enumerated below. We have given the names which we received with the plants, and those of the parties from whom we received them, for the benefit of other collectors, as well as to show what a very considerable number, of *C*uprèssinæ for example, may be obtained in British nurseries. We have not included in the list the higher-priced species of pines and firs, because plants of these we did not think it right to request from parties possessing them, except in the case of the Horticultural Society. As the nomenclature of spiræas is in a state of some confusion, we are very anxious to increase our list of that most beautiful genus, and shall feel particularly obliged to any person who will send us plants which appear from their names to be of different kinds from those we have got. There are also some of the low-priced *A*biétinæ which we do not yet possess, and which we should be glad to receive from those who can spare them. For the plants already in our possession, we beg to return our best thanks to the Horticultural Society, to Messrs. Loddiges, to Mr. Knight, Messrs. Lee, Messrs, Whitley and Osborn, Messrs. P. Lawson and Son, Mr. May, Mr. Charlwood, Mr. Rivers, Mr. Low, Messrs. R. Donald and Son, and Messrs. C. Sclater and Son.

Spiræas.

S. opulifòlia *L.* (Lodd.)
S. o. nàna *Lodd.* (Lodd.)
S. *c*hamædrifòlia *L.* (Lodd.)
S. c. subracemòsa *Ser.* (W. and O.)
S. c. *u*lmifòlia *Scop.* (Lodd.)
S. c. flexuòsa *Fis.* (Lodd.)
S. c. sibírica *Hort.* (Lodd.)
S. c. däùrica *Hort.* (Lodd.)
S. c. *b*etulæfòlia *Lodd.* (Lodd.)
S. trilobàta *L.* (Lodd.)
S. alpìna *L.* (Lodd.)
S. *h*ypericiòlia *Dec.* (Lodd.)
S. infléxa *H. S. G.* (Lodd.)
S. argéntea *Lodd. Coll.* (Lodd.)
S. nàna *Lodd. Coll.* (Lodd.)
S. h. *t*halictröides *Pall.* (Lodd.)
S. nùtans *Royle.* (Lodd.)
S. corymbòsa *Rafin.* (Lodd.)
S. *v*acciniifòlia *D. Don.* (Lodd.)
S. laxiflòra *Lindl.* (H. S.)
S. bélla *Sims.* (W. and O.)
S. *s*alicifòlia *L.* (Lodd.)
S. s. cárnea *Ait.* (W. and O.)
S. s. paniculàta *Willd.* (W. & O.)

S. s. latifòlia *Willd.* (W. and O.)
S. s. grandiflòra. (Lodd.)
S. s. mìnor *Lodd.* (Lodd.)
S. s. ròsea *Lodd.* (Lodd.)
S. canadénsis. (Lodd.)
S. árctica. (Rivers.)
S. incarnàta *Lodd.*
S. lanceolàta *Hort.* (Lodd.)
S. tomentòsa *L.* (Lodd.)
S. lævigàta *L.* (Lodd.)
*S. ariæ*fòlia *Smith.* (W. and O.)
S. rotundifòlia *Lindl.* (H. S.)
*S. Sc*òpa *Lodd.* (Lodd.)
S. físsa *Lindl.* (Lodd.)
S. Tobolski *Lodd.* (Lodd.)
S. Nikoudiért*ii* Lodd. (Lodd.)
*S. s*orbifòlia *L.* (Lodd.)
S. s. däùrica *Lodd.* (Lodd.)
S. Lindley*àna* Wall. (H. S.)

North American Oaks.

I. *White American Oaks.*

Quércus álba *L.* (May of Leeming Lane, Bedale, Yorkshire.)
Q. macrocárpa *W.* (Lodd.)
Q. microcárpa *Lodd.* (Lodd.)
Q. stellàta *Willd.* (Lodd.)

II. *Chestnut Oaks.*

*Q. Pr*ìnus *L.* (Lodd.)
Q. P. montàna *Willd.* (Lodd.)
Q. P. tomentòsa *Mx.* (Charlwood.)

III. *Red American Oaks.*

Q. rùbra *L.* (Charlwood.)
Q. champaniénsis *Lodd.* (Lodd.)
Q. coccínea *Willd.* (Charlwood.)
Q. falcàta *Mx.* (Lodd.)
Q. tríloba *Willd.* (Lodd.)
Q. tinctòria *Willd.* (Lodd.)
Q. nìgra *Wang.* (May.)
Q. palústris *Willd.* (Lodd.)
Q. Catesbæ̀i sempervìrens. (Rivers.)

IV. *Black American Oaks.*

Q. nìgra *L.* (Lodd.)
Q. marylándica *Ray.* (Lodd.)
Q. aquǎtica *Soland.* (Lodd.)
Q. Banísteri Michx. (Lodd.)

V. *Willow Oaks.*

*Q. Ph*éllos *L.* (Lodd.)
Q. heterophýlla *Mx.* (Rivers.)

VI. *Live Oaks.*

Q. vìrens *Ait.* (Rivers.)

*T*axàceæ.

The species and varieties which we have collected are as follows, to which we should be glad of such additions as can be got: —

*T*áxus baccàta fastigiàta.
T. b. horizontàlis *Lawson.* (P. Lawson and Son.)
T. b. fòliis aúreis *Hort.* (Knight.)
T. b. bariénsis *Knight.* (Knight.)
T. canadénsis *W.* (Lodd.)
T. japónica *Lodd.* (Lodd.)

Pines.

I. *Leaves 2 in a sheath.*

*P*ìnus sylvéstris vulgàris. (Charlwood, and P. Lawson and Son.)
P. s. uncinàta. (Lawson.)
P. s. haguenénsis *Arb. Brit.* (Lawson.)
P. Larício *Poir.* (Lawson.)
P. [? Larício] neglécta *Law.* (Lawson.)
P. (L.) austrìaca *Höss.* (Lawson.)
  Syn. *P.* nígricans *Hort.* (H. S.)
P. taúrica *Hort.* (H. S.)
P. (L.) pyrenàica *L.* (Lawson.)
*P. P*ináster *Ait.* (Lawson.)
P. P. marítimus. (Lawson.)
*P. P*ínea *L.* (Lawson.)
P. P. crética *Hort.* (H. S.)
P. halepénsis *Ait.* (H. S.)
P. brúttia *Ten.* (H. S.)
P. púngens *Michx.* (Lawson.)

II. *Leaves* 3 *in a sheath.*

*P*ìnus rígida *Mill.* (H. S.)
P. (r.) serótina *Michx.* (Lawson.)
P. *Teocòte* S. & D. (H. S.)
P. pátula *S. & D.* (H. S.)
P. Gerard*iàna* W. (H. S.)
P. *Chilghòza* Elphinstone. (H. S.)

III. *Leaves* 5, *rarely* 4, *in a sheath.*

P. Hartwèg*ii* Lindl. (H. S.)
P. Montezùm*æ* L. (H. S.)
P. macrophýlla *L.* (H. S.)
P. Pseùdo-*S*tròbus. (H. S.)
P. filifòlia *Lindl.* (H. S.)
P. tenuifòlia *H. S.* (H. S.)
P. oöcárpa *Schd.* (H. S.)
P. oöcarpöìdes *Benth.* (H. S.)
P. apulcénsis *Lindl.* (H. S.)
P. occidentàlis *Swz.* (H. S.)
P. *Cémbra* L. (Lawson.)
P. *S*tròbus *L.*
P. (*S.*) excélsa *W.* (H. S.)
P. *Ayacahuìte* Ehr. (H. S.)

Firs, Larches, and Cedars.

I. *Leaves tetragonal, awl-shaped, scattered in insertion.*

A'bies excélsa commùnis *Dec.*
A. Clanbrasil*iàna.* (Lawson.)
A. orientàlis *Tourn.* (H. S.)
A. nìgra *Poir.* (Lawson.)
A. n. var. grácilis *Lawson.* (Lawson.)
A. Smith*iàna* Arb. Brit. (H. S.)
A. *Morínda* Hort. (H. S.)
A. Menzièsi*i* Doug. (H. S.)
A. canadénsis *Mx.* (Lawson.)
*P*ícea pectinàta. (Lawson.)
P. (p.) cephalónica *Arb. Brit.* (H. S.)
P. (p.) *Pinsàpo* Arb. Brit. (H. S.)
P. (p.) *Píchta* Arb. Brit. (H. S.)
P. balsàmea *Arb. Brit.* (Lawson.)
P. (b.) Fràser*i* Arb. Brit. (Lawson.)
P. Webb*iàna* Arb. Brit. (H. S.)
P. spectábilis *Lam. Monog.* (Lawson.)
*L*àrix europæ'a commùnis *Lawson.* (Lawson.)
L. sp. from France, *Laws.* (Lawson.)
L. microcárpa *Laws.* (Lawson.)
*C*èdrus Libàni *Barr.* (Lawson.)
C. *Deodàra* Roxb. (H. S.)
Araucària imbricàta *Pav.* (Low.)

Cupre´ssinæ.

*T*hùja occidentàlis *L.*
T. (o.) plicàta *Donn.* (Lodd.)
T. Ware*àna* Booth Cat. (Lodd.)
T. orientàlis *L.* (Lodd.)
T. o. tatárica *Arb. Brit.* (Lodd.)
T. o. japónica *Hort.* (Lodd.)
T. o. pyramidàlis *Knight.* (Knight.)
T. o. hýbrida *Hort.* (Knight.)
T. o. nepalénsis *Lodd.* (Lodd.)
T. péndula *Lamb.* (Knight.)
Cállitris quadriválvis *Ven.* (Lee.)
C. flagellifórmis *Hort.* (Lee.)
*C*upréssus sempervìr. *L.* (W. and O.)
C. fastigiàta *Hort.* (Knight.)
C. expánsa *Hort. Par.* (H. S.)
C. horizontàlis *Mill.* (Lodd.)
C. *t*hyöìdes *L.* (W. and O.)
C. *t.* fòliis variegàtis *Hort.* (Donald.)
C. lusitánica *Tourn.* (W. and O.)
C. torulòsa *Lamb.* (H. S.)
C. Lambert*iàna* H. S. (H. S.)
C. thurífera *H. B. et K.* (Lodd.)
C. Tournefórt*ii* Audibert. (Knight.)
C. austràlis *Pers.* (Lawson.)
C. religiòsa *Lee.* (Lee.)
C. sp. from Himalaya *Law.* (Lawson)
*J*uníperus commùnis *L.* (W. and O.)
J. c. suécica *Ait. Hort.* (W. and O.)
J. c. hibérnica *Hort.* (W. and O.)
J. c. péndula. (Rivers.)
J. alpìna *Raii Syn.* (Lodd.)
J. däùrica *Hort. and Booth.* (Lodd.)
J. cracòvia *Lodd.* (Lodd.)
J. oblónga *Arb. Brit.* (Lee.)
J. canadénsis *Lodd. Cat.* (Lodd.)
J. *O*xýcedrus *L.* (Lodd.)
J. drupàcea *Lab.* (Knight.)
J. tetragòna *H. B. et K.* (Lee.)
J. virginiàna *L.* (Lodd.)
J. v. horizontàlis. (Rivers.)
J. horizontàlis *Lodd.* (Lodd.)
J. gossainthànea *Hort.* (Lodd.)
J. Bedford*iàna* Hort. (Knight.)
J. bermudiàna *L.* (H. S.)
J. fláccida *Schiede.* (H. S.)
J. *S*abìna *Arb. Brit.* (Lodd.)
J. (*S.*) *t*amariscifòlia *Ait.* (Lodd.)
J. (*S.*) fòliis variegàtis *Mart.* (Lodd.)
J. (*S.*) prostràta *Arb. Brit.* (Lodd.)
J. (*S.*) nàna *Smith.* (Knight.)
J. (*S.*) sibírica *Hort.* (Lodd.)
J. (*S.*) Hudson*iàna* Pin. Wob. (Lod.)
J. phœnícea *L.* (Lodd.)
J. (p.) lýcia *L.* (Knight.)

J. thurífera *L.* (Lee.)
J. excélsa *Willd.* (Knight.)
J. squamàta *Don.* (H. S.)
J. recúrva *Ham.* (W. and O.)
J. r. var. *H. S.* (Lee.)
J. repánda *Hort.* (Knight.)
J. hispánica *Mill.* (Knight.)
J. chinénsis *L.* (Lodd.)
J. dealbàta *Hort.* (Lee.)
J. Smith*iàna* Arb. Brit. (Lee.)

ART. XI. *Arboricultural Notices.*

U'LMUS *montàna péndula*, which we have long tried to find the origin of, was, we lately learned from Mr. Booth of Hamburg, found in a bed of seedlings in the Perth Nursery, a year or two after the peace. Mr. Booth purchased the plant, and from it arose the whole stock here and on the Continent.

I'*lex* A*quifòlium fastigiàtum* exists in a garden in the neighbourhood of Edinburgh, near the new cemetery, as well as in a garden in Derby.

I'*lex* A*quifòlium péndulum*, a very strongly marked variety, has also been lately discovered in Dalkeith Park, and, we believe, will soon be in the trade.

New Varieties. — Nurserymen should look over their beds of seedlings before they are transplanted, with a view to discovering pendulous varieties and fastigiate varieties, which, probably, every tree in existence is liable to sport into. We have, within the present century, found both of them in the common oak, the Scotch elm, and the common hawthorn; and one sport in several species, such as the pendulous common ash, sophora, &c. They should also, in the leafing season, look after varieties that come early into leaf, such as the Glastonbury thorn; in summer, those that sport in their foliage, such as the one-leaved ash, the eagle's claw maple, and the fern-leaved oak; and, in autumn and winter, those that retain their leaves longer than usual, such as the evergreen privet. The time will probably one day come when every species will have its fastigiate, its pendulous, its early, its late, its variegated-leaved, and its abnormal-leaved, varieties.

F*àgus antárctica and* b*etuloìdes.* — We have lately had an opportunity of seeing these interesting beeches in Kew Gardens. They are in a healthy state, and, we understand, strike from cuttings without difficulty; so that, thanks to the excellent system now pursued at Kew of distributing and exchanging with other botanic gardens and with the nurserymen, these trees will soon be as generally diffused as their merits will entitle them to be. (See Sir W. Hooker's *Notes on the Botany of the Antarctic Voyage*, p. 54.)

ART. XII. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 373.)

THE design, *fig* 100., is a plan of the Roccoco Garden of Baron Hügel in the neighbourhood of Vienna, mentioned with so much praise in an article on the baron's country residence in our preceding volume, p. 150. For the plan we are indebted to a friend, who procured it at Vienna about a year ago. This gentleman observes on it, that, though the beds did not look so well in reality as they do on paper, from the acute angles of the lobes of the larger masses, and from the inequality of the heights of the flowers with which they were planted at the time he saw it, yet, as it is always supplied with the best kinds of flowers, and kept in the very highest order, it is the admiration of every one.

a and *b* are beds, we suppose, of low shrubs; *c*, circular bed, separated by a zone of turf, *e*, from the bed *d*; *f*, border of turf; *g*, *h*, gravel walks; *i*, bed with a pedestal and statue in the centre; *k*, a small oval bed, separated from *l*, by a zone of turf; *m*, *n*, acute-lobed beds on turf; *o*, *p*, beds with lobes, terminating with less acute points.

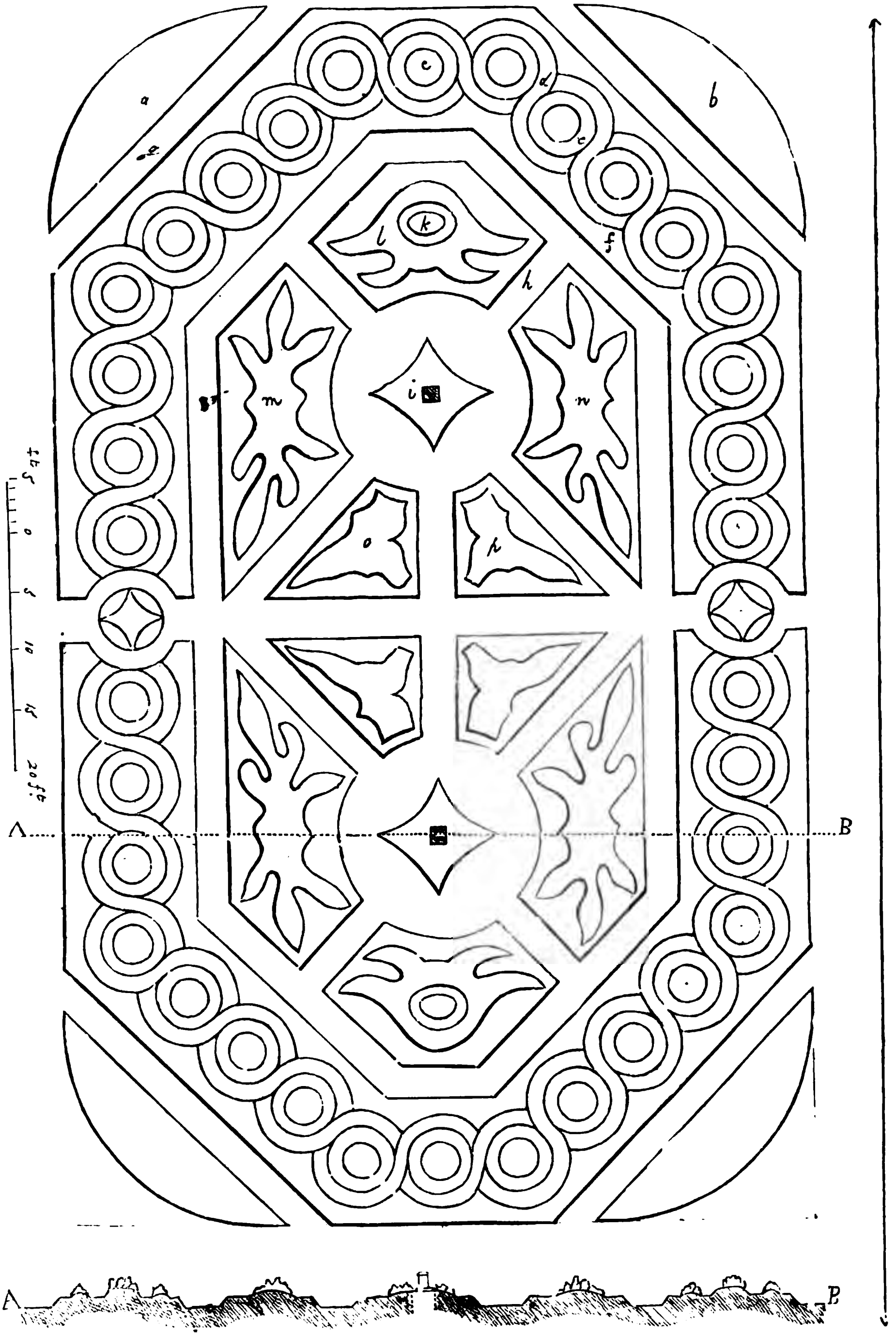

Fig. 100. *The Rococo Garden of Baron Hügel, at Hietzing, near Vienna.*

The section A B shows that the walks are considerably below the level of the compartments containing the beds, and that the edgings to those walks are sloped down ; and, if the section is correct according to the scale, these slopes exceed a foot in perpendicular depth ; a taste not uncommon in France and Germany, but rarely to be met with in England. It gives the walks the character of ditches.

The running pattern on the circumferential border originated in England, we believe, by the Dowager Duchess of Bedford, about the year 1800, is capable of producing a very brilliant effect, by planting the circular beds (*c*) with brilliant colours, each alternating with white; for example, beginning at *c*, and proceeding to the right, we might have dark red, white, blue, white, yellow, white, scarlet, white, purple, white, and so on. The interlacing beds (*d*) might be planted exactly on the same principle, but omitting white. Proceeding to the right from the bed *d*, which may be yellow, the next may be crimson, the next purple, then orange, then blue, and so on.

If we were asked our opinion of this design, we should say, in one word, that the dug beds in the interior were not in harmony of form with those of the surrounding chain pattern; they have scarcely a single line in common. This must be obvious at the first glance to every man with the eye of an artist. But we will go a little into detail for the sake of others.

The beds, with the exception of those of the chain pattern with which the figure is surrounded, are not appropriate to the subject. Beds with so many acute recesses and sharp-pointed prominences can very rarely be covered with plants in such a manner as not to render the form of the dug ground more prominent than the form of the surface covered by the flowers; now the dug ground being merely the means of attaining the end, this can never be in good taste, because it is not consistent with good sense to render the former of more importance than the latter. This would be true, even if these beds were artistically designed; but they are wholly deficient of merit as works of art. Beds for flowers in a flower-garden may either be composed of geometrical lines and forms, as in Elizabethan flower-gardens, or of arabesque shapes, as shown in the French gardens in the Louis XIV. style; but to what style of art can we refer the beds *m, n, o, p,* which remind us of the leaves of *A'rum Dracúnculus*, or some exotic aroïdaceous plant. If they were sufficiently large to occupy twenty or thirty acres each, and to be planted with trees and shrubs, which would effectually prevent more than one or two sides of the figure from being seen at one view, then we should say that, with the exception of the acute points of the lobes, the shapes might pass ; but, for a flower-garden, where the whole of each bed will be seen at once, they are, from want of harmony, and from their unfitness for being covered, totally inadmissible in this design or in any other. A minor argument is, that the shape of such beds cut out in turf, unless they have concealed brick, stone, or wood edges, can never be kept correct; and it is a principle in the arts of design, that every design should be suitable to the purpose for which it is to be used, and to the nature of the materials employed in its execution. Another minor objection is, that the beds *m, n, o, p,* &c., have not sufficient relation to the boundary lawn on which they are placed. A far better effect would have been produced, in our opinion, by simply marking off a grass margin all round each compartment, and considering the interior as the bed. The beds would then have been of the exact shape of the compartments, less the width of the surrounding verge. It is true that this would not have harmonised these beds with the surrounding circular forms, but it would have harmonised each bed with the form of the compartment on which it was placed, and rendered it fit for being covered with flowers. But even the required harmony might have been given in a considerable degree by gently curving the edges of the beds, and by substituting circular beds for *i* and *k*. Had the two beds *i* been circular, and not of their present discordant shape, they would have harmonised beautifully with the surrounding row of circular beds (*c*); and, had the beds marked *k* been circular, instead of oval, and a little larger than *c*, they would have formed beautiful connecting links between the larger circular beds (*i*) and the smaller (*c*).

Much of the effect of every flower-garden depends on the manner in which it is connected with the surrounding scenery. From the description of Baron Hügel's residence, already referred to, we are not able to form an opinion on this subject. It is said to be a garden within a garden, and to have become the model garden of Austria. If the last is the case, we can only say that we are sorry to hear of the diffusion of so much bad taste. We have no doubt, from the intellectual activity of the Austrian head gardeners, and especially such men as M. Charles Rauch, this design will be the means of leading to something better. Whoever contrived the design has had little or no artistical knowledge, otherwise he would have given artistical shapes to the beds *m*, *n*, *o*, *p*; and he has not had a proper conception of what the shapes adapted for a flower-garden ought to be, otherwise he would have had no beds that were not of comparatively simple forms, with no acute angles, whatever might be his talents for designing forms of intricacy.

(*To be continued.*)

Art. XIII. *Botanical, Floricultural, and Arboricultural Notices of the Kinds of Plants newly introduced into British Gardens and Plantations, or which have been originated in them; together with additional Information respecting Plants (whether old or new) already in Cultivation: the whole intended to serve as a perpetual Supplement to the "Encyclopædia of Plants," the "Hortus Britannicus," the "Hortus Lignosus," and the "Arboretum et Fruticetum Britannicum."*

Curtis's Botanical Magazine; in monthly numbers, each containing seven plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Sir William Jackson Hooker, LL.D., &c., Director of the Royal Botanic Garden, Kew.

Edwards's Botanical Register; in monthly numbers, new series, each containing six plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Dr. Lindley, Professor of Botany in the University College, London.

Paxton's Magazine of Botany, and Register of Flowering Plants; in monthly numbers; large 8vo; 2*s.* 6*d.* each.

Ranuncula`ceæ.

1638. *TRO'LLIUS*
acaúlis *Lindl.* stemless ⚘ △ or ½ jl Y Cashmere 1842. D s.l.p Bot. reg. 1843, 32.

A very pretty hardy herbaceous plant, the seeds of which were sent by Dr. Royle from Cashmere. The flowers are of a golden yellow, and spread open like those of an anemone, instead of having the globe-like appearance of the common *Tróllius* europæ`us. The plant was first mentioned in the *Miscellany* to the *Bot. Reg.* for 1842. (*Bot. Reg.*, June, 1843.)

1641. *HELLE'BORUS*
olýmpicus *Lindl.* Olympian ⚘ △ or 2 jn G Bithynia 1842. D s.p Bot. reg. 1842, 58.

This very handsome species of hellebore is a native of the Bithynian Olympus, whence it was sent to the Horticultural Society by Mr. Sandison, Her Majesty's consul at Brusa. It has very handsome palmate leaves, and pale green flowers, which are white at the tips of the sepals. It is quite hardy, but it should be grown in peat soil, in a moist situation. (*Bot. Reg.*, Oct. 1842.)

Dilleniàceæ.

Candóllea tetrándra Lindl. This is a larger and much handsomer plant than *Candóllea cuneifórmis*. The leaves are about 2 in. long, broad in proportion, and coarsely toothed. The flowers resemble those of Hibbértia volùbilis, but are four times as large, and of a paler yellow. The petals are also flat, and the stamens regularly arranged in bundles of four each. (*Bot. Reg.*, June, 1842, Misc.)

Berberídeæ.

Bérberis umbellàta Wall. A very handsome new hardy shrub, raised by Wm. Wells, Esq., of Redleaf, from Nepal seeds. " The branches and spines are remarkably slender." The flowers are small, and are produced in long stalked clusters. Thé leaves are narrow, and glaucous beneath, with very distinct veins. (*Bot. Reg.*, June, 1842, Misc.)

Mahònia pállida Hart. A very beautiful half-hardy evergreen Mexican shrub, which was raised in the garden of Sir Charles Lemon at Carclew, in 1831. The flowers are produced on a slender raceme about 9 in. long ; they are on short pedicels, and are of a pale straw colour. The berries are globose and purple. (*Bot. Reg.*, March, 1843, Misc.)

Pittosporàceæ.

Pittósporum bícolor Hook. A small shrub with chocolate-coloured flowers and deep-green leaves, which are silvery beneath. It is a native of Van Diemen's Land, where its seeds were collected by Mr. Backhouse of York, during his travels in that country, and it has flowered in the greenhouse of John Willmore, Esq., of Oldfield, near Birmingham. (*Bot. Reg.*, March, 1843, Misc.)

*Winter*àceæ.

1615. ILLI'CIUM
religiòsum *L.* holy ■ ⌋ or 4 mr YG. Japan 1842. C s.p Bot. mag. 3965.

The sacred illicium of Japan has long been confounded with the aniseed tree of the Chinese, but Dr. Siebold has proved that the two are distinct species, and that the present plant, which has yellowish green flowers, is the one used in religious ceremonies by the Japanese. It is said that in Japan the plant attains the height of a cherry tree, but the only one at present in Great Britain is not more than 4 ft. high. It is in the Royal Botanic Gardens at Kew. (*Bot. Mag.*, Sept. 1842.)

M*alvàceæ.*

2004. *MA'LVA*
campanulàta *Paxt.* campanulate ▲ pr 1 jn. a. Li ...... 1838. C co Paxt. vol. ix. p. 173.

This is a very pretty suffruticose plant, with bell-shaped flowers and numerous stems. The leaves are very deeply cut ; and the flowers, which are of a pale lilac, are produced in clusters at the points of the shoots. After it has done flowering, the stems should be cut down, and the pots placed in a cold frame during the winter. If planted out in the month of May, it will make a beautiful bed in the open garden. It is generally propagated by dividing the roots, as it does not ripen its seeds freely. The origin of this plant is not known; but it was first found in Mr. Henderson's nursery, Pine-Apple Place, about the year 1838. (*Paxt. Mag. of Bot.*, Sept. 1842.)

*Ternstræm*iàceæ.

1612. SAURAU'J*A*
spectábilis *Hook.* showy ■ □ or 10 su W. Bolivia 1838. C co Bot. mag. 3982.

This very handsome plant is a stove shrub, which will apparently grow to a considerable size. It flowers abundantly ; a specimen in Mr. Knight's nursery at Chelsea having borne, when only 20 in. high, no less than thirty-seven large panicles of its pretty, white, fragrant flowers. The leaves are of considerable size, and of very delicate texture. (*Bot. Mag.*, Dec. 1842.)

*Malpighi*àceæ.

3656. STIGMAPHY'LLUM
heterophýllum *Hook.* ⸗ □ or 10 d Y Tucuman 1841. C s.l Bot. mag. 4014.

This genus is nearly allied to Banistè*ria*, and the flowers are of the same light yellow. It was reared by Mr. Veitch of Exeter from seed sent from Buenos Ayres, but Sir W. Hooker informs us that its native country is Tucuman. " It is a ready flowerer, and promises to be worthy of cultivation in every stove or warm greenhouse, making a beautiful object if trained against trelliswork." (*Bot. Mag.*, May, 1843.)

G*eraniàceæ*.

1932. *GERA'NIUM* [1842, 52.
erlánthum *Dec.* woolly-flowered ⚘ Δ pr 2 jn.jl C California 1840. D co Bot. reg.

This is a " robust hardy perennial, of easy culture, growing from 1 ft. to 2 ft. high in any good garden soil. It flowers freely during the months of June and July, and is easily increased by dividing the old plant when in a state of rest, or by seeds." The seeds should be sown as soon as they are ripe, and then the plants raised from them will flower the following season. (*Bot. Reg.*, September.)

Tropæolàceæ.

1148. TROPÆ'OLUM [1842, 65.; and Paxt. Mag. Bot. vol. ix. p. 247.
azùreum *Miers* azure ⚘ ⊔ or 3 au.s B Chili 1842. C s.l.p Bot. mag. 3985.; Bot. reg.

This plant was first mentioned by Mr. Miers in his travels in Chili, but it appeared so improbable to botanists, that a blue flower should be produced in a genus the flowers of which are generally yellow, that for some time the fact was not believed. The reason of this doubt was the hypothesis published by Professor DeCandolle respecting what were called the cyanic and xanthic series of colours in flowers; according to which it was supposed, that when a pure yellow had been observed in the flowers of any particular genus, no species of it could have flowers of a pure blue. The incorrectness of this assertion might have been perceived from the first, as in the genus *A*nemòne there are bright yellow flowers in *A.* palmàta, and bright blue ones in *A.* apennìna ; but, coming from so high an authority as that of Professor DeCandolle, the hypothesis was long believed, and its fallacy is only now beginning to be acknowledged. The blue Tropæ'olum " is increased by cuttings, taken off before the plant begins to flower. The young plants, when struck, should not be either potted off, or the tops tied up, but allowed to grow and hang down over the pot." When the plant is trained for flowering, it should be tied to some ornamental wirework in the same manner as T. tricolòrum. When the plants have done flowering, they should be allowed a period of rest till they begin to move the following season. (*Bot. Reg.*, Dec. 1842.)

O*xalidàceæ*.

1414. *O'XALIS* [1842, 64.
rubrocincta *Lindl.* red-edged Δ ⊔ pr 1 s Y Guatemala 1841. D r.m Bot. reg.

A pretty little plant with bright yellow flowers, and rather remarkable leaves, which are very succulent and brittle, breaking almost like glass. They have a broad reddish-purple edge, and are dotted with purple beneath. The seeds of this species were among the earth sent with some plants from Guatemala. (*Bot. Reg.*, 1842, 64.)

R*utàceæ*.

ACRONY'CHIA *Forster*. (From *akros*, the top, and *onux*, a claw ; an incurved point to each petal.)
[C co Bot. mag. 3994.
Cunninghàmi Hook. *Mr. Allan* Cunningham's ⚘ ⊔ or 7 my.jn W Moreton Bay 1838.

This handsome shrub was discovered at Moreton Bay by the late Mr. Cunningham, the botanist, and sent by him to the gardens at Kew. The flowers greatly resemble those of the orange, and have nearly the same fragrance, but combined with the aromatic warmth of ginger. The leaves smell like turpentine. It is a free-growing shrub, and only requires the ordinary treatment of greenhouse plants.

1154. CORRÆ'*A* [p. 267.
bicolor *Paxt.* two-coloured ⚘ ⊔ or 2 s.o R.W hyb. 1838. C s.l Paxt. mag. bot. vol. ix.

A pretty hybrid raised between C. pulchélla and C. álba It requires only the common treatment of greenhouse shrubs. (*Paxt. Mag. Bot.*, Jan. 1843.

Celastrìneæ.

Càtha paniculàta Scheid. A shrub about 3 ft. high, supposed to be a native of the East Indies. The flowers are greenish, and without fragrance. (*Bot. Reg.*, May, 1843, Misc.)

Ceanòthus divaricàtus Nutt. A Californian shrub, loaded with clusters of blue flowers. The branches are spiny, and the leaves are of a beautiful deep glossy green. (*Bot. Reg.*, May, 1843, Misc.)

Leguminòsæ.

1940. HO'VE*A* 30090 púngens var. màjor.

A large-flowered variety of this well-known species. (*Paxt. Mag. Bot.*, April, 1843.)

[vol. x. p. 103.
spléndens *Paxt.* splendid ɛ ⊔ pr 2 my.jn B Swan River 1840. co Paxt. mag. of bot.

A pretty little species of Hòve*a* producing its flowers in pairs. The standard is a bright blue, with a white ring at the bottom, and the wings and keel are purplish. The following observations are interesting, as regarding the culture of plants of this genus. "Unless the roots of these plants are carefully watered, and the soil kept well drained, there is no tribe more likely to die off in a sudden manner, when they have attained any size. They should be potted high in the centre of the pot, so as to have the junction of the roots with the stem almost bare; and we would prefer a soil with more of light open loam in it than one containing so much heath-mould as is commonly used. But, whatever soil be chosen, it should be well mixed with pieces of broken stone or potsherds for drainage." (*Paxt. Mag. Bot.*, June, 1843.)

racemulòsa *Benth.* ɛ ⊔ pr 2 my L Swan River 1841. C s.p Bot. reg. 1843, 4.

This is also a native of the Swan River colony, and was introduced by Captain Mangles. The flowers are small, but very pretty. They are lilac with a little yellow at the base of the stamen, and they are produced in racemes. (*Bot. Reg.* Jan. 1843.)

3584. LA'LAG*E* [mag. bot. vol. ix. p. 171.
hove*æfòlia* Paxt. Hovea-leafed ɛ ⊔ or 2 f Y.R.P New Holland 1841. C s.p Paxt.

This is a very pretty little plant, still more showy than L. ornàta. It requires an airy situation with abundance of light. (*Paxt. Mag. Bot.* Sept. 1842.)

1248. OXYLO'BIUM 30400 capitàtum *Bot. Reg.* 1843, 16. [1843, 36.
obovàtum obovate ɛ ⊔ pr 2 ap R.Y Swan River 1841. C s.p Bot. reg.

This is the same plant as that called by Mr. Bentham O. cuneàtum, on account of its wedge-shaped leaves, but Dr. Lindley does not think there is any specific difference between it and Mr. Bentham's O. obovàtum. It "is best cultivated in rather poor soil, and great care should be taken never to let it suffer for want of water, as in that case it rarely recovers." (*Bot. Reg.*, July, 1843.)

1248. OXYLO'BIUM 10514 Pultenè*æ*.

1943 BOSSIÆ'*A*
virgàta *Hook.* twiggy ɛ ⊔ pr 2 jn Y.R Swan River 1841. s.p Bot. mag. 3986.

A Swan River species with elongated twiggy branches, which are flattened and winged. The flowers are very small, and of no beauty. (*Bot. Mag.*, Dec. 1842.)

paucifòlia Benth. A little Swan River spiny bush, with yellow and crimson flowers. This plant was flowered by Mr. Low of Clapton. Bossiæ'*a* eriocárpa (see *Hort. Brit.*, p. 614.) has lately flowered with Mr. Groom of Clapham; but the flowers are of a dingy nankeen colour. The habit of the plant, however, and its leaves, are much handsomer than those of most other species of the genus.

Art. XIV. *On the Rust in Grapes.* By Aliquis.

I have just been tying down the young shoots of some vines, and, while doing so, I began to think on the variety of opinions existing with respect to rust on grapes; some referring the cause to one thing and some to another.

After what has been said on the subject by far more able men than myself, it will, perhaps, be thought presumption in me to say anything at all about it; but, with your leave, I'll just tell you, and those who like to read it, what I know about it. I do not pretend to say that I could cure it at all times; but this I know, that whereas it was once a common thing with me, now I never see it. As it is possible some one may be situated as I was at the time I used to have rust in abundance, I will proceed to state how I imagine I got rid of it.

About twenty years ago I entered upon the situation I still hold. The vines, I should suppose, were full twenty years old then. They appeared to have been planted with very little preparation, in a very indifferent soil, with plantations of trees and shrubs within fifteen yards of the house, and so situated as to render it almost, if not altogether, impossible to improve the border, so that I had little chance of doing them any good, if the evil existed in the border, as I then thought it did, and as others think now. Since that period, however, I have come to the conclusion that internal management has quite as much to do with it as the soil in which they grow. My first attempt inside the house was to remove the flues, from going almost close to the wall, to about 2 ft. from it, in order that the vines should not be burnt at the bottom of the stems, where they entered the house, while they were cold at the top. I then had the wall cut down where the stems had been led up through to reach the rafters, in doing which I discovered that *only a small hole* up the centre of the wall had been left when the vines were young, and that, in some instances, they had so completely filled it, that the little rough bits of mortar had got embedded in the vines, in such a way as to make one wonder how they lived at all, rather than that they did no better. To remedy this, I had the wall cut clean through from bottom to top, leaving an opening of about 4 in. wide for the vines. I then had the outside built up with very thin bricks, in cement, from the border to the plate on which the front sashes slide, a height of about 2 ft., the inside being left quite open. By this means you will readily see that, instead of the vines being squeezed in the dry brickwork, they were left free to enjoy the moist atmosphere of the house, which moisture is caused by damping the flues and constructing the tops of them so that they will hold water from twelve to twenty-four hours, according to the degree of heat required; a precaution quite necessary with those who, like myself, are obliged to put up with the old-fashioned brick flues, though, by the by, if they are well constructed and properly managed, they are not so far inferior to hot-water pipes as some people would have us believe. Having arranged matters to my satisfaction, so as to be able to keep up the required degree of heat, which you will remember must at that time be done to a great nicety, as it would have been but little use then to have talked of trying from 10° to 20° less heat at night than what was required by day (for that would have been thought quite sufficient to destroy almost every thing in the house), I used all my endeavours to produce a good crop of grapes, and in this I succeeded, and was much pleased with them, till, after having thinned them, I perceived something brown upon them, which was chiefly confined to the Black Hamburgs. Up to this time I do not recollect ever having seen or heard of rust; for I dare say you recollect that at that time horticultural knowledge did not travel at the railroad pace it has done since your Magazine and the weekly gardening papers have been published, conveying misfortunes and remedies from one end of the country to the other in a few hours. What was the cause, or what the remedy to remove it, I was quite ignorant of; but from the circumstance of only some bunches being so, while others were free from it, I could not come to the conclusion that it was in the soil. I was, however, obliged to let it remain, with the hope that at some future time a remedy would be discovered for it; but this was not all, for, as soon as the berries began to colour, I discovered the stalks of many of them, especially those at the end of the bunches and those at the end of the shoulders, turning black, or, as I believe it is now termed, shanking. This was at once attributed to the cold wet bottom on which the vines grew, but, fortunately for my argument, this, as I stated before, could not be altered. These berries were of course soon got rid of, as they made the bunches look bad. I began now to look forward to the time when they should become black, but here again I was disappointed, as many of them never got beyond red, while many others did not even get to that, neither did they acquire that firmness in the skin which they ought; for, although large and sweet, they were pale and soft. Having gone through all the various stages of one year's growth, I could think of nothing short of fresh borders to remove the evil, till towards the end of the summer I observed that at the upper end of the shoots, where some of the buds had started and brought fruit, these bunches being left to themselves, *without thinning*, and fully exposed to the opening of the top sashes, had, notwithstanding this apparent neglect, become quite black, firm-fleshed, and free from shanking or rust, though of course very small, as they were not considered worth notice. Now, Sir, if the evil existed in the soil, do you not think it would have affected the latter as well as the former? I thought so, and therefore did nothing to the border beyond adding some fresh loam to the top, and continuing to dress it every year or thereabouts with rotten dung, making it a rule never to dig the border, but, previously to laying on the dung, just break the crust at top. But to return: how long things went on in the above way I cannot at this time remember, but, as it regards the rust, it was suggested that probably the handling of the berries in thinning might cause it. I therefore selected several bunches from various parts of the house, and rubbed them all over; I then marked them and left them to their fate, and I had the satisfaction to see that they were rusted beyond any I had ever seen, and felt perfectly satisfied that for the future it might be greatly prevented; and since I have taken care that they should not be handled or rubbed, I do not believe I have had any rust.

I have recently seen something of this sort stated elsewhere, and contradicted; but, as far as my experience goes, I can assert that it is true. Having got over this difficulty, I began to think of getting over the others. By this time, I had received a hint from some one (I think the late Mr. Knight) respecting night temperature and morning air. This seemed so reasonable that I at once gave up the idea of keeping the thermometer so regular as before, and since that time I have grown as good grapes as can reasonably be expected from the same vines, and have as good a crop as I would wish to see. The house is about 60 ft. long, 15 ft. wide, rafters 17 ft., with one shoot or shoots up each rafter, and the same up the middle of the light producing about forty bunches to a light. Of course I do not mean to say that vines thus situated and thus cropped will produce grapes like those on prepared borders of modern times, but quite sufficient for the demands of most families.

These remarks have been occasioned by reading the various opinions on the subject in different works, some of which seem to me to carry little weight with them. Therefore, before any of your readers incur a great expense to remedy the evil complained of, I would beg to advise them to try a more natural method of growing them, if, like me, they have hitherto treated them more tenderly than they require. Should these observations, coming from this remote spot, prove acceptable to you or your readers, perhaps at some time or other I may be induced to trouble you again. I hope you will excuse what has been thus hastily thrown together by one who at that time never thought of becoming a writer in the *Gardener's Magazine*, and will, perhaps, be thought by some, that it were better if he had still been turning the clods of the valley.

Middlesex, April, 1843.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Consuming the Smoke of Hothouse Furnaces.—The injury done to plants by the portions of soot which are carried up the chimney flues of the furnaces for heating hot-water apparatus, steam boilers, and common smoke flues, and diffused in the atmosphere, is considerable; and the unsightly appearance produced is a worse evil than even the injury. As hothouse fires are seldom required to burn bright there is no way of getting rid of the nuisance effectually, except by burning coke or wood; but in some cases where one large furnace heats all the hothouses of an extensive range, as used to be the case formerly at Messrs. Loddiges, Hackney, then some mode of burning the smoke may be adopted. We have in p. 314. noticed Mr. Juckes's plan, which we have since seen at work in the establishment of Messrs. Easton and Amos, and consider by far the most effectual smoke-consuming apparatus hitherto invented; and we have now to describe that adopted in the printing-office of the Messrs. Chambers of Edinburgh, the proprietors and publishers of that admirable work, *Chambers's Edinburgh Journal.* Messrs. Chambers employ a four-horse high-pressure engine. At first they adopted Ivison's patent process for burning the smoke, which answered well, but they altered to a plan which answered better, and which is thus described.

"The furnace, which is of the usual construction, we keep closed with an iron door. All the air required for combustion is admitted from the ash-pit beneath. We, however, keep the mouth of the ash-pit closed also, and admit air into it by a tube near the bottom on one side. Into the ash-pit is likewise conducted the pipe of waste steam from the engine, by which a constant stream of steam mingles with the air, and ascends into the fire above. This administration of steam with atmospheric air to the flame of the furnace destroys the smoke. In point of fact, no smoke is observable from the chimney; certainly not more at least than from a small room fire, except when the process is deranged by opening the furnace door to shovel in coal. The coal being supplied and the door shut, the smoke instantly dies away, and speedily disappears. The air-tube into the ash-pit is not conducted immediately from the outer atmosphere, but from a series of tributary tubes from the respective floors of our printing-office, by which means the foul air of the house is drawn away and consumed. Of course the tube from the outer air will have the same effect. To any steam-engine furnace this plan can be applied at a most insignificant cost, and without any structural alteration." (*W. Chambers*, in the *Scotsman*, May 13. 1843.) In our Volume for 1837, p. 370., a mode of adding strength to the fire of a washing-house boiler by admitting the waste steam from the boiler into the ash-pit, immediately under the bars of the grate, is described; and from the above information by Mr. Chambers it would appear that smoke is consumed, as well as strength added to the fire.

Having sent the foregoing paragraph to an eminent engineer, he returned it with the following remarks:—

"Hothouses, conservatories, &c., have generally low chimneys, hence combustion is very imperfect; a jet of steam introduced beneath the bars quickens the draught, and prevents the bars from becoming choked by clinker. In factories where condensing engines are used, working with high chimneys, this plan would not be economical, and the steam thrown beneath the bars might be said to be nearly all waste; the chimney causes sufficient draught and combustion. In factories where non-condensing engines are used a jet of steam from the exhaust pipe will do good by working the damper lower and accelerating the draught by the steam beneath the bars, as the steam would otherwise be thrown useless into the atmosphere, while cold air must be introduced to support combustion; and I doubt not but that a certain portion of steam would be found more beneficial, believing it to be composed of elements more pure and suitable for combustion than an equal volume of atmospheric air. — *E. A. May* 29. 1843." — *Cond.*

Asphalte Walks, for the entrance walks to small suburban villas and street houses having front gardens, may be strongly recommended, from their always being in order, never yielding to the feet in the wettest weather, lodging no water, and requiring no weeding or cleaning, farther than sweeping off any leaves or other matters that may fall on them. — *Cond.*

Rockwork in the Walton Nursery, Liverpool.— A friend having described this rockwork as the most remarkable he had ever seen, and recommended us to get a description of it, we wrote to Mr. Skirving, and the following is an extract from the answer of his foreman of the landscape-gardening department, Mr. Henderson : —

" With respect to the rockwork in this nursery, I regret to inform you that the person (William Newman), a natural genius, who has done himself so much credit in erecting rock grottoes, &c., in this neighbourhood, died suddenly a week or two previously to your note reaching us. Having sent for him for the purpose of forming a rock, &c., for a gentleman near Liverpool, on his way from London per railway he got wet and caught cold, which (in a frame predisposed) brought on fever, and carried him off in a few days; leaving a wife and seven children wholly unprovided to deplore an irreparable loss.

" His eldest son (only twenty years of age) having been for some years the constant companion and assistant of his father, we are now anxious to establish in his place, he being the only support and dependence of his mother and her family; and we think he will in a short time be quite equal to his father in taste and execution. I enclose two of his pencil sketches, which may convey to you some idea of the progress he has already made, and enable you to form an opinion of his work. For an individual who has been denied the advantages of education, or any opportunity for mental improvement, or time for study, except that connected with unremitting labour, I think he evinces something of latent talent.

" In two instances where he has finished work, I could see little to find fault with, except that of not having his blocks or masses large enough, rather frittering them into pieces too small, or divisions rather insignificant; the hint was sufficient. I find he has already corrected himself in this particular.

" He is at present employed for Thomas Sands, Esq., Aighurth, near this town. His mother lives (and of course it is his home) at No. 2. Hamilton Street, Wandsworth Road, London.

" Should you feel satisfied that he is worthy your support and interest as an artist, it will, I assure you, be an act of charity towards the widow and the orphan to lend him a helping hand. I know that he is now remitting to his mother regularly the larger portion of his weekly earnings.

" The following is, I fear, a very imperfect description of the rock here.

" The rockwork in the Walton Nursery is placed at the boundary of the small lawn and pleasure-ground attached to the dwelling-house, and divides the former from the nursery grounds. It is, properly speaking, an arch thrown across one of the main walks, but has wings, or rugged masses, extending into and losing their terminations among dense evergreen shrubberies.

" The skeleton, or shell, of rockwork, being hollow and filled with soil, is formed of common walling stone, and the fused or vitrified masses from brick-kilns; these masses are afterwards covered with Roman cement, and formed into blocks, recesses, and projections, or overhanging crags, just as may suit the taste or fancy of the artist. Apertures and interstices are left for receiving alpine shrubs and rock plants. The whole is left to dry properly; then it is painted with oil paint, so as to have all the appearance of veined or stratified granite; of course the sky outline is broken and pointed generally. All shell, coral, or vitrified materials are rejected, except where the proprietor of the grounds insists on their introduction. I now allude to rockwork; grottoes are another matter.— *William Henderson. Walton Nursery, July* 8. 1843."

Such of our readers as have it in their power to recommend the young artist and dutiful son, the distressing situation of whose family is described by Mr. Henderson, will, we are sure, consider it a duty to do so. To many gentlemen and ladies anxious to put up rockwork, but who do not know how to set about it, such a workman as Mr. Newman, who joins the artist to the artisan, would be a treasure.— *Cond.*

Baillie's rounded enamelled Case Lock, with secret and secure fixings, is a great improvement on locks of the common kind; and we can safely recommend it both for villas and cottages, and for the doors of greenhouses. For the latter it is particularly adapted from the sharp angles, which in the case of common locks are very apt to tear ladies' dresses, being entirely done away with. Altogether this lock is a very great improvement, and it costs very little more than locks of the common kind.— *Cond.*

Art. II. *Domestic Notices.*

ENGLAND.

The Exhibitions in the Horticultural Society's Garden on June 17. and July 12. were, as usual, well attended: on the former day there were 11,060, and on the latter 7560; the total number of visitors at the three exhibitions was 23,335 persons. Among the articles exhibited on July 12. was a collection of Mexican pines and firs in pots, raised in the garden by Mr. Gordon, chiefly from seeds sent home by M. Hartweg; the plants were beautifully grown, and nothing could be more vigorous than the shoots produced by most of them, especially those of *Pícea* religiòsa. There was also a vigorous plant of *Thùja* péndula, which appears to be a sport from *Thùja* orientàlis, as M. Leroy of Angers found it in a bed of seedlings of that species. The Duke of Devonshire, with his usual liberality, threw his grounds open to the visitors to the garden on July 12., who seemed highly gratified with His Grace's kindness.

The grounds of the Chiswick Villa, so much admired in the time of Lord Burlington and Kent, were in better order than we ever saw them before. Breadth has, in some degree, been restored to the sloping lawn, by removing (or perhaps they may have died) a number of the trees and shrubs with which it was dotted over. Much, however, requires to be done at this place to render it what it ought to be. The first thing that we should do would be to cut down the old cedars close to the entrance-front, which destroy the effect of the beautiful architecture of the house; we would then form a terrace on the side of the house next the sloping bank, out of which terrace we would lead a proper walk to the surrounding or boundary walk, which at present is entered in a mean insignificant manner, as if it were of little consequence, though it is the main walk of the place. Nothing can be more awkward than the junction of the winding approach road with the broad straight avenue which leads to the entrance-front of the house, unless it be the termination of that avenue at the house without any expansion whatever. The other end of the avenue terminates equally abruptly, without expansion or terminating object, so that it appears totally unconnected at that end, and gives no idea of continuity. At such a place as this one would expect the undergrowths among the trees to be chiefly flowering evergreens; and near the water at this season, for the place is naturally exceedingly green and dull, we expect azaleas in masses. The rhododendrons, we are happy to see, are being increased in number; and the azaleas and other flowering shrubs with warm colours, and for winter red-barked dog-woods and yellow-barked willows, will doubtless appear in due time. There are some large and also curious specimens of trees in these grounds, all of which have been noticed in our *Arboretum Britannicum;* but we cannot help directing attention to the birch, the trunk of which is now about a foot in diameter, which is growing out of the heart of the trunk of a cherry tree, which, though only alive in the outer rim, still continues to grow and increase. Near this is an immense Oriental plane, which last year ripened its seeds. It is to be regretted that nurserymen continue to neglect this beautiful and very hardy tree, preferring that comparatively worthless one the Occidental plane, because it strikes more readily by cuttings. Magnòl*ia* macrophýlla has this year produced some dozens of flowers; but the fine specimen of Quércus vìrens that we figured is dead. The walk from the Horticultural Society's garden to the ornamental grounds of the duke's villa passes through His Grace's kitchen-garden, the surrounding walls of which, we observed, were crowned or rather coped with a row of plants of *I*'ris germánica. A gutter, lined with Roman cement, we were informed, was made along the top of the wall to retain the soil in which the plants are planted, and they are watered occasionally. This taste, being that of a duke, will of course be admired; but, notwithstanding the very great respect which we have for the Duke of Devonshire as an extremely liberal and kind-hearted man, we cannot bring ourselves to look with pleasure on aquatic plants placed in such a position. If a fringe of flowers were to be placed there, *E*rýsimum Perowsk*iànum*, wallflowers, iberis, snapdragons, pinks, and a host of evergreen Crucíferæ, Labiàtæ, Caryophýlleæ, &c., that would have kept up a bloom throughout the summer, might have been employed. Nevertheless, the Duke of Devonshire, as well as every othe individual, has a right to indulge in his own particular taste; but when we express our admiration of one part of a residence or scene, we may be permitted also to mention those parts of it of which we cannot approve. One advantage of covering the top of a wall with irises is, that they will not shed their seeds on the grounds below, which cannot be said of the flora of the wall tops of some kitchen-gardens and even botanic gardens: Kew, for example, as it *used to be.*

The second Exhibition of the Royal Botanic Society in the Regent's Park, on June 28., was still better attended than the first, and it is gratifying to find that these exhibitions are bringing forward a new class of visitors altogether to garden exhibitions, viz. families who can spare an hour or two to go to a place within a ride of a few minutes, or a short walk of their residence, who could not spare a day and the expense of a carriage of some kind during the whole day, to go to Turnham Green. The mount in these gardens is a great attraction, and the natural arrangement of herbaceous plants will soon become exceedingly interesting. When the winter garden is once completed, the attraction, for that season, will probably surpass that of every thing of the kind in the neighbourhood of London.

Kew Gardens, since they have been put under the direction of Sir W. Hooker, have undergone very great improvements, which fully justify the government in having employed that enthusiastic botanist and active-minded accomplished man. The wall which separated the botanic garden from the pleasure-ground has been thrown down, so as to admit views to glades among the trees and shrubs; some new houses have been built, and others have been altered and greatly improved. The araucaria has been relieved from the brick parapet that surrounded it, and several cart-loads of suitable soil have been placed at the extremities of the roots, and the whole turfed over. We should have preferred omitting the turf, and mulching the ground as far as the roots extended, and a little further, with the leaves of pines and firs, in order the more readily to admit the air and rain to the roots, and supply them with the saline ingredients common to the Coníferæ. Pines and firs in a state of nature always destroy the grass and other herbaceous plants that spring up under the shade of their lower branches, but unfortunately this tree has lost its lower branches, and therefore requires the aid of art to do what they would have done. We were much gratified to observe a very complete collection of British plants arranged according to the natural system, and correctly named; but we cannot altogether approve of an avenue of standard roses carried through the middle of the botanic garden. Shrubs of kinds which make small and curious heads, such as different species of *Caragàna*, as may be seen in Lee's nursery, and a variety of other things of the kind, a list of which will be found in the concluding article on cemeteries, which will appear in the October Number of this Magazine, would, we think, be preferable. We were also glad to see the heaps of rubbish commonly designated rockwork done away with, conceiving them, unless constructed in a very different manner from what they have ever been at Kew, as totally unsuitable for botanic gardens. In a pleasure-ground, a rockwork is chiefly to be considered as a pictorial feature; in a botanic garden it ought never, in our opinion, to be resorted to, except for such rock plants as will not thrive on the general surface of the garden. We would apply this principle equally in the case of marsh plants and aquatics. The next thing that we should like to see done at Kew would be an extension of the arboretum, or rather the planting of a new one, to extend along the whole of the circumferential plantation of the pleasure-ground. The length of the walk would be, we believe, nearly two miles, and this would allow of most, or all, of the trees attaining their full size, and also of adding any new species or varieties in their proper places from time to time, as they were introduced or originated. We have elsewhere (see Arb. Not.) mentioned the Antarctic beeches; and we also saw some species of *Clématis*, *Jasmìnum*, *Rùbus*, and Dacrýdium, from New Zealand, some of which may possibly be hardy, more especially Dacrýdium *Mài*. As these plants, and a number of others, are about to be sold by auction, those that are worth cultivating will soon be extensively propagated. — *Cond.*

The Royal Agricultural Society of England held their great annual meeting at Derby, on July 11, 12, and 13. It was well attended, and the exhibition of new implements was far greater than had ever before taken place. For a full account of all that passed, as well as for engravings of some of the implements, we refer to the *New Farmer's Journal* and *Supplement* of July 17., and to Johnson's *Annual Register of Agricultural Improvements for* 1843.—*Cond.*

SCOTLAND.

Testimonial to Dr. Neill.—On June 22. the Scottish practical gardeners, amounting to 600 presented their testimonial to Dr. Neill, to whom gardening and Scotch gardeners, all over the world, but more especially in Scotland, are more indebted than to any man alive, or that ever has lived. Dr. Neill is not only a scientific naturalist and horticulturist, but, as every one knows who has had the happiness to become acquainted with him, one of the kindest-hearted of human beings.

"The testimonial is a handsome silver vase, supported on a triangular pedestal, and standing on an appropriate plateau. The lid of the vase is surmounted with a figure of Britannia in the Scottish form, and, with this exception, is plain, and rests on the projecting border of the vase, which is composed of a broad wreath of the vine, in fruit and foliage. Below this wreath the vase narrows much, forming the neck; and afterwards shoulders out in a graceful manner. On the centre compartment, on one side of the vase, is placed an excellent medallion likeness of Dr. Neill, surrounded with a wreath of flowers, composed of Nierembérg*ia* calycìna, Philibért*ia* grandiflòra, and Tweéd*ia* cærùlea. On each side of the wreath is arranged a festoon of fruit, composed of the principal varieties now in cultivation, both from tropical and temperate climates. The fruit is separated from the flowers by two ornamental honeysuckle scrolls undulating to the pedestal; on the top of each is placed a juvenile figure, the one representing Spring, and the other Summer, each bearing its appropriate emblems. On the centre of the opposite side of the vase, corresponding with the medallion, is placed the inscription, in the following words: —

PRESENTED
TO
PATRICK NEILL, LL.D. F.R.S.E., ETC.
SECRETARY OF THE
ROYAL CALEDONIAN HORTICULTURAL SOCIETY,
BY
SIX HUNDRED PRACTICAL GARDENERS,
NATIVES OF SCOTLAND,
IN TESTIMONY OF THEIR HIGH ESTEEM
FOR HIS PERSONAL CHARACTER,
AND GRATITUDE FOR THE ZEALOUS AND LONG-CONTINUED
DEVOTION OF HIS TIME AND TALENTS
TO THE CAUSE OF HORTICULTURE,
AND THE INTERESTS OF
ITS CULTIVATORS.
EDINBURGH, XXII. JUNE M.DCCC.XLIII.

Surrounding the inscription is placed another wreath, composed of Nierembérg*ia* intermèdia, Manéttia cordifòlia, Tropæ'olum pentaphyllum, and Physiánthus álbicans. The plants forming these wreaths were first figured in the botanical periodicals, from specimens cultivated in Dr. Neill's garden at Canonmills, and most of them were introduced into Britain by himself. Two festoons of fruit also adorn this side, corresponding with those described, and separated from the flowers by two honeysuckle scrolls, surmounted by figures emblematical of Autumn and Winter. The handles represent vine branches entwined together, and diverging at top and bottom, clasping the vase.

"The vase is united to its triangular pedestal by a collet composed of acanthus leaves, and spreading out at top and bottom. On the upper surface of the triangular pedestal are placed three female figures emblematical of Flora, Pomona, and Ceres. On the tablet of the pedestal, immediately below the medallion, is placed the Neill crest, surrounded with a wreath of the Scotch thistle. On the second tablet is represented a span-roofed greenhouse, stove, and vinery, being an exact perspective representation of the hothouses in Dr. Neill's garden at Canonmills. On the third tablet is represented a group of garden implements in common use at the present day. Three beautiful representations of some of those plants which have been named in compliment to Dr. Neill are placed on the small square tablets occupying the corners of the triangular pedestal immediately above the feet; viz., Alstrœmèr*ia* Neíll*ii*, *E*rìca Neíll*ii*, and Neíll*ia* thyrsiflòra, the last of which is a genus native of Nepal, and named in compliment to Dr. Neill by the late Professor Don of King's College, London.

"The plateau or stand is also richly embossed with flowers, and the centre composed of thick plate mirror.

"The vase, with its plateau, is the workmanship of Messrs. Mackay, Cunninghame, and Co., 47. New Buildings, North Bridge, Edinburgh. It stands 2 ft. high, and is considered by experienced judges to be the most elaborate piece of plate ever manufactured in Edinburgh."

Great praise is due to Mr. M'Nab, jun., for his extraordinary activity in procuring the cooperation of so many individuals in so short a time. We understand, also, that Mr. M'Nab was in a great measure the author of the design of the vase, of which, as well as of a portrait of Dr. Neill, we may probably, at some future time, be able to give engravings.

At the presentation dinner, a great number of persons, particularly practical gardeners, were present; and Mr. Sang, nurseryman, Kirkaldy, a man in every way after Dr. Neill's own heart, and, if we may be permitted to say so, also after ours, was placed in the chair. Mr. Sang was supported on the right by Dr. Neill; Professor Traill; Mr. Gray, banker, Greenock; Mr. Mackay, jeweller; Mr. Stevenson, civil engineer; Mr. Graham of Robhill, W.S.; Captain Gemmill; Mr. Stephens, Editor of the *Agricultural Journal*, &c.: on the left by James Wilson, Esq.; Charles Cobbold, Esq.; Mr. Geo. Logan, W.S.;

Mr. A. Symington; Mr. Isaac Anderson, S. S. C.; Dr. Spittal; Charles Wm. Wright, Esq., &c. The croupiers were Mr. Murray of the Glasgow Botanic Gardens; Mr. Mackintosh, Dalkeith Park; and Mr. Smith, Hopetoun House. Among the company were many eminent horticulturists, assembled from all parts of Scotland, to do honour to the merits of Dr. Neill.

After the presentation, and the usual loyal toasts had been proposed,

The Chairman said: "My first duty is to return you my sincere thanks for the high honour you have done me in placing me in my present situation on such a day, a day of no ordinary felicity to me, and to those gentlemen who are here assembled, when we have amongst us such a highly respectable and learned individual, and such a perfectly successful horticulturist, as Dr. Neill. (Cheers.) Whatever I might say in his honour is already in your minds; and the feelings which have brought you here render praise from me altogether unnecessary. I do not know where I should begin in any observations I may make upon that gentleman. I have known him long; but I did not know him before he was a most enthusiastic horticulturist. I found him four and thirty years ago devoted to that pleasant science; and I found him not then a novice; for even then he would bear a comparison with the most intelligent of his compeers. (Cheers.) He has never ceased, from that time up to this day, to continue in that most desirable and gratifying pursuit; and he has never permitted an opportunity to pass without embracing it to bring any plant into notice which might be useful; and one of his chief excellences is, that he never permits an opportunity to pass without endeavouring to confer some favour upon horticulturists. Many of the young men whom I see around me can bear testimony to this, that when they have devoted their energies under their master's directions to produce something that may attract notice, they at once look up to Dr. Neill, and they invariably receive from him kindness, attention, and courtesy. (Cheers.) It is that feeling that has brought so many of us together at this time. But what are we? We are only a trifling portion of those gentlemen who have resolved to express their admiration of Dr. Neill. There are here but two or three of his neighbours. His admirers stretch not only over Great Britain; they stretch over the Continent; they have found their way into Asia; and very many of the subscribers to the Neill testimonial live in America. (Cheers.) I cannot look upon this scene, and contrast it with the time to which I before alluded, without feelings somewhat peculiar. Then our exhibitions were little cared for by the public till Dr. Neill excited them to attend, by bringing forward annually the choice productions of the Horticultural Society, of which he was then, and has since continued to be, the indefatigable secretary. We, the practical gardeners, also brought forward our productions, and with them we brought our little descriptions of them; but, as you may expect from what you have heard of me, they were ill filled up. (Laughter and cheers.) But they never appeared before the public in that state; they got a new coat on their back, and we got all the honour of it; but there sits the gentleman who did it. (Cheers.) Then look at the *Horticultural Memoirs* from the year 1809 to the present day; look at the whole of them. It was this gentleman's careful hand that went over every one of them, generally speaking, and put them into a decent dress. We see horticulture now raised to a position of great eminence; we see people looking upon the wonderful productions of nature wherever they get an opportunity of doing so; and the gentleman who assisted us to attain this pitch of eminence was my friend Dr. Neill. (Cheers.) I have no need to say a word more; you all know, better than I do, his merits. I live at a distance; Dr. Neill is among you every day: but I see that he is every where respected. I believe that he is a gentleman of high attainments, of cultivated mind; and I see that he has taken the highest honours which science confers upon any of her worshippers (cheers); and I am sure, judging from ourselves, he could not get these honours unless he well deserved them. (Cheers.) There are no fewer than 600 brethren united together; and we who are here represent our brethren scattered over the world, as I have already mentioned; and they have thought it right to express their feelings of gratitude, their feelings of pleasure in a small mark of esteem, as a testimony of their regard to the worthy Doctor; and the purport of this meeting is therefore to present that learned and excellent gentleman with this mark and token of the esteem the horticulturists of Scotland have for him. I proceed, therefore, without farther preface, to present the testimonial to the Doctor." (Here the chaplet of flowers in which the vase had been covered, was removed amid the cheers of the audience.) The chairman proceeded. "Dr. Neill, permit me, as the representative of 600 brethren of Scottish practical horticulturists, as a token of their admiration and gratitude for what you have done for their science, to present you with this small testimonial, which they beg you to accept, with their warmest wishes for your long life and happiness. May you live in happiness and high felicity, not among us, but in the community where you reside; and when at last you close your eyes, may you go to the great Parent of all, and there enjoy the reward of your works!" (Loud applause.) Before sitting down, the chairman explained to the meeting that this was exclusively a Scottish testimonial, as the contributions of several English gardeners had been declined.

Dr. Neill rose, evidently under considerable emotion, and said: "I assure you it would be vain in me to attempt giving utterance to the feelings which now agitate my breast, and you cannot wonder after what has just been said and after all that has passed. I must just beg of you to look into your own generous breasts, and to imagine what ought to be the feelings of gratitude in my mind, and to give credit to me for such feelings. One thing I am sure of, that my merits have been much overrated. I have no claims upon your attention, except those of long and willing service as secretary to the Caledonian Horticultural Society. (Cheers.) I am aware that this meeting has no proper connexion with that Society; but I hope you will pardon me for alluding to it, because it is only from my connexion with that Society that I have come in contact with the practical gardeners of Scotland, and it is to them I owe this great meeting. With regard to the observations made by our excellent chairman, it is now thirty-four years since I met with him in that Society, soon after its institution, when Dr. Duncan, the father and founder of the Society, was good enough to] propose to conjoin me with Walter Nicol, as joint secretary. He was a most distinguished horticulturist of his day, and eminent in his profession as a landscape-gardener. He also was, however, soon carried to the grave, and I was then associated with Mr. Thomas Dickson, a scientific name, and a name well known in the annals of Scottish horticulture. He, too, also soon departed, and for the last quarter of a century I have been the sole secretary. No doubt, the office is attended with occasional labour; but it has been upon the whole a pleasant office to me. Although there is no salary attached to it any more than there is to the office of treasurer, yet I must confess that I have not been without my rewards, and I cannot fail on this occasion to mention and to acknowledge them. So long ago as 1817, I received the gold medal which I now wear; and in 1821, when I was absent on the Continent, the Society was kind enough to vote me a massy piece of plate—a salver, with an inscription written by Sir George Mackenzie. And, as if that were not enough, to my great surprise and most unexpectedly, last autumn, Lord Murray proposed that my bust should be placed in the New Hall, executed in marble by Mr. Steell, the most eminent sculptor of the day. (Loud cheers.) And now, to crown all these proceedings, the practical gardeners of Scotland have come forward with this testimonial, and I must confess that is a consummation which I never anticipated. (Cheers.) Your chairman has mentioned that no fewer than 600 Scotch horticulturists have united in contributing to it. That is most overwhelming. It is far, indeed, beyond what the warmest imagination of my youthful fancy ever led me to expect. It is also delightful to me to see placed in the chair the father of our profession; and to see him supported by the curators of the botanic gardens in Edinburgh and Glasgow, by the chief gardener to the noble president of the Horticultural Society, himself a distinguished writer on horticulture and an excellent practical gardener, and by Mr. Smith of Hopetoun House, the earliest and most successful practical gardener in Scotland, and also a writer on horticultural science. (Cheers.) I assure you that a simple vote of thanks from this assemblage representing, as it does, 600 of the practical gardeners of Scotland, — a vote of thanks would have been enough, and more than enough, for me. But no: so far were they from confining themselves to thanks, that they had embodied their thanks in this testimonial which the chairman had repeatedly chosen to designate as small, but which I will call costly, splendid, and lasting. (Hear.) It is the most magnificent piece of workmanship of the kind which I have seen. I observe that the floral decorations have been selected with scientific taste, and my offices have been placed on it; that is, indeed, flattering; but it certainly appropriates the thing most completely, and I will say that it has been executed with consummate taste, and does the utmost credit to the state of art in Edinburgh. (Cheers.) I feel the deep obligations which you have placed me under. I am sensible that my merits have been much overrated; but be assured of this, that, as long as life lasts, I shall retain a grateful sense of your kindness; and I believe that the events of this evening will be among the last things which will fade from my memory." (Loud cheers.)

Dr. Neill again rose and proposed in a second speech, as a toast, " Scottish Gardeners and Horticulturists," which was answered by Mr. Smith of Hopetoun House. The chairman proposed the health of " Mr. James M'Nab of the Experimental Gardens," who had bestowed no ordinary exertion in getting up the testimonial, &c. Many other professional and local toasts were given, prefaced with appropriate speeches, and the company separated in the happiest mood, about 10 o'clock. For farther details we must refer to the *Scotsman* of June 24th, and *Edinburgh Evening Courant* of the same date.

The Highland and Agricultural Society of Scotland held their half-yearly meeting on July 4th, when evidence was given of a spirit being at work by no means inferior in point of activity to that stirred up in England by the English Agricultural Society. (*Scotsman*, July 8. 1843.)

A new public Cemetery at Edinburgh has lately been opened to the public. It is in a most delightful situation at Warriston, about two miles from town, and commanding fine views of the sea, Edinburgh Castle, Calton Hill, Arthur's Seat, and the Costorphin and Pentland Hills. We have not seen the plan, but, when we do so, we shall notice the subject again, hoping in the meantime that the arrangement is such that now, and in all future time, every grave may be examined, without stepping over any other grave. — *Cond.*

Art. III. *Retrospective Criticism.*

Errata.—In Vol. VII. p. 665., line 24. from the bottom, for " ten miles," read " four miles."

In the Vol. for 1842, p. 189., some observations are made respecting the river Delaware, which might lead the reader to believe that that river was sometimes obstructed by ice as early as October 15., whereas, Dr. Mease informs us, it is never frozen in October, and rarely before Christmas.— *Cond.*

Art. IV. *Queries and Answers.*

A Caterpillar on Geraniums, &c.—I have often heard gardeners and amateurs complain of the shoots and leaves of their geraniums being eaten very much by an insect that is not easy to discover. Many suppose it to commit its depredations in the night. I have often discovered it feeding at different times in the day; and I beg to enclose one of them that was caught feeding at mid-day. I do not know the name of it, but would feel greatly obliged to you for its name. It is not a small quantity that it eats; and this you will readily discover, by putting it under a good-sized glass along with a branch of geranium. Should it arrive alive you will be able to see its manœuvres, which are very curious. When it has climbed up on a plant to a favourite feeding place, it fixes itself firmly to the part with two very strong claws not far from its head, with its body hanging down perpendicularly, in readiness to drop on the earth at the approach of an enemy. On going near, or in the least way touching the plant it is feeding on, it drops off instantaneously like a log, and there it will lie nearly straight, and quite motionless; and, by its resembling an old bit of dead stick or root, and so much the colour of the earth it often escapes detection. It is certainly a very curious insect to look at through a microscope.—*James Barnes. Bicton Gardens, May* 23. 1843.

[We sent the insect to Mr. Westwood, who returned the following observations on it.]

The caterpillar you sent me from Mr. Barnes, which annoys him by feeding on his geraniums, is that of one of our most interesting species of Geométridæ, the caterpillars of which are so well known under the name of loopers, from their geometrical mode of progression, so well described by Kollar, in his account of the Geómetra brumàta (p. 213. of Miss Loudon's translation of Kollar's *Treatise of Insects injurious to Gardeners, Foresters, and Farmers.* London, Smith, 1840.).

The insect in question is the caterpillar of the Geómetra (Ourápteryx) sambucària, or swallow-tail moth, an insect not uncommon in gardens, but which I am not aware has hitherto been noticed as attacking the geranium. As, however, it feeds on many kinds of plants, it is not surprising that the strong shoots of a geranium should suit its taste. It is remarkable, structurally, by having two sharp points at the hind extremity of the body, just above the two caudal feet, whereby it firmly attaches itself to the stems, and not by those next the head, as Mr. Barnes notices. In its habits it does not differ from the greater number of the species of the family to which it belongs. The perfect insect is distinguished from all our native species by its pale brimstone-coloured wings, and by the hind pair terminating in a pair of short tails (analogous ? to the points at the extremity of the body of the caterpillar). Lyonnet found some of these caterpillars in the autumn upon a sallow, on the leaves of which they feed, fasting during the winter, and resuming their feeding in the spring; others were found on an apricot tree at the end of April, and they assumed the chrysalis state about the middle of May. Some of them, however, continued feeding till the middle of June, and it was not until the 8th of July that the perfect moths were produced. They fly by twilight, and are very easily distinguished by their large size (being larger than the small white garden butterfly), and pale colour. Their flight is feeble, as the size of their wings and slenderness of the veins clearly prove.

Although the caterpillars certainly bear a great resemblance to a dried bit of stick or dead twig, yet the practised eye will soon detect them, and I know no more serviceable mode of destroying them than carefully to look over the plants on which the gnawed leaves indicate their presence, and then to crush them to death under foot. The perfect insects may be caught without difficulty with a small gauze hand net.

The insect is figured in all its states by Curtis (*British Ent.*, pl. 508.); Donovan (*Brit. Insects*, 5. pl. 170.); Albin., pl. 94.; and Wilkes, pl. 78.—*J. O. Westwood. Grove Road, Hammersmith, May* 25. 1843.

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GARDENER'S MAGAZINE,
SEPTEMBER, 1843.

ORIGINAL COMMUNICATIONS.

Art. I. *Comparative Physiology.* By R. Lymburn.

(*Continued from* p. 396.)

In Book II. *On Special and Comparative Physiology*, Chap. V. *On Ingestion and Absorption of Aliment in general*, he says: —“ The peculiar characteristic of living beings has been stated to be the power which each possesses of maintaining, for a certain period, its form and structure, in defiance of the physical properties of its parts, which are at the same time undergoing alterations both in composition and form. In the developement of the germ, it is not so much the *structure itself* which is furnished by the parent, as the *capability* of forming that structure, by the conversion of external materials into organised tissues, possessed of peculiar properties, by the process of assimilation. These materials constitute the *aliment* necessary for the developement of the living system, and in proportion to the activity of its operations will be the occasion for their supply. The larvæ of the flesh fly are said to increase in weight 200 times in 24 hours. The Bovista gigantea, a fungus of the puff-ball tribe, has been known to increase in one night from the size of a mere point to that of a huge gourd, estimated to contain forty-seven thousand millions of cellules.”

From the opinions above stated, it will be perceived Dr. Carpenter takes a different view of developement from that entertained by Bonnet, Main, and others. The different opinions on this subject are given at great length in the late edition of Müller's *Physiology*, who, as we stated before, considers the power only of reproducing the individual to reside in the germ. It is *potentially* not *actually*, he says, the new being. The observations of Schwann have shown “ that in a preexisting structureless substance, which may be situated either within or on the exterior of cells already formed, new cells are developed in a manner regulated by determinate laws, and these new cells undergo various modifications and transformations by which they are converted into the elementary organic tissues." At p. 1437. he describes buds as being the result of superfluous matter, separated in an undeveloped state of organisation from the system, the special organisation of the system being subsequently developed by its connexion. When we see sap, extravasated on parts of plants that have been cut accidentally, formed into masses of buds from its connexion merely with the living tissue, it must strike us that here at least is an accidental formation that could not have been contained in embryo in the germ, and that the doctrine is at least too far stretched when it is maintained that all the parts ever to be developed are contained in the germ. So well is this fact known to gardeners, that they are in the habit of cutting notches in bare stems to produce buds from the extravasation of sap, when they wish to clothe the stem with shoots without cutting in the head. The activity of the living principle varies much in the different species of living beings; it varies also in different individuals of the same species, and at different periods in the same individual; and it is not from the quantity of aliment introduced into the stomach of the animal, or into the soil the stomach of the plant, that we can correspondingly produce growth. Much depends on the activity of the absorbent vessels, and on the activity of the assimilating organs after being absorbed. It arises from this that a check given to growth in young seedling crops is permanently injurious and should be guarded against, and that if we can by any means, as cutting in the shoots of young plants, give accelerated activity to the vital principle, it is likely to continue, if fostered. Aliment is essential, and growth cannot be carried on without it, but other things must be attended to besides merely exhibiting food. By keeping the soil open and porous we increase heat, introduce air, and facilitate the healthy action of the stomach of plants.

"The supply of aliment is required not only to develope the organism, but for its maintenance also. The tendency to decompose exists not only in dead organic matter, but in the living tissues; and, as already stated, it is probable the peculiar influence of vitality is exercised not so much in resisting that tendency as in providing for its effects by the removal of all particles in a state of incipient decay: the supply of new alimentary materials must be equal in quantity and regularity. This may be regarded as the principal source of the continued demand for nutriment in the adult system. The regeneration of organs and tissues, after what appeared their total destruction by disease or accident, is a process no less remarkable than their first formation, and no less evidently displays the foresight of the original Designer. In the harder parts of animals and vegetables the absorption of old and deposition of new particles take place so slowly in the natural condition as to be scarcely perceptible; but when disease or injury calls the actions of reparation into play, they are effected with a rapidity and certainty not surpassed in any other parts of the system. The constant movements of the body produce a waste or wearing away of the material, both of its harder and softer structures; hence arises one cause of the increased demand for nutriment from continued muscular exertion."

Vitality has been generally supposed to exert a resisting force, preserving the materials endowed with vitality from chemical decomposition. Some, however, have carried the opposite doctrine so far as to maintain that matter endowed with life is more susceptible of change. Undoubtedly, where life is most active in plants, the parts are more susceptible of decomposition when vitality is paralysed, than in the more solid tissues; but the preserving power of life is perhaps only the more displayed in preserving parts so susceptible of change from decomposition. Liebig seems to consider life as exercising a resisting power; the more that nitrogen abounds in the tissue, he considers, the greater is the susceptibility of change. The actions of the mind waste the nervous system, he says, and those of the body the muscular, producing inert dead matter, which is removed by the oxygen inhaled and made use of in the formation of bile and urine. The vital force he describes as produced by the oxidation of carbon and hydrogen, especially the former; and the source of carbon as confined to the waste or decayed particles of the body and the non-azotised constituents of the food, as starch, sugar, &c., which, he says, may be called the food of the liver. When these are exhausted the fat of the body is next consumed; and starvation ends in a deficiency of vital force being generated from a want of carbon, and the tissues thus deprived of vitality becoming subject to chemical decomposition. Müller seems to entertain similar views of the resistance opposed by vitality to chemical agency, and it seems to be the most general opinion.

"One of the most striking differences between animals and vegetables is to be found in the aliments on which they are respectively supported, and the mode of their *ingestion* or introduction into the system. The essential nutriment of plants appears to be supplied by the inorganic world, chiefly *water* with saline impregnations, and *carbon;* the water partly from the soil and partly from the moisture of the atmosphere; the carbon principally from the carbonic acid of the air; but most plants require for their healthy growth that it be introduced by the roots also. It appears that the organic matter which rich soils contain is itself applied to the nutrition of the plant, by being decomposed into carbonic acid and dissolved in the water of the soil. It is found that those soils which contain the most steady and equable supply of carbonic acid are the most favourable to vegetable growth. It is only within a short period that the dependence of the activity of vegetation on a due supply of *nitrogen* has been ascertained. Nitrogen in the form of ammonia is regarded by Liebig as the most powerful stimulant to the vegetative processes, when the other requisite conditions are supplied. It is interesting to remark that none of the elements of vegetables are introduced in a simple or uncombined state into the plants; oxygen and hydrogen are combined in the state of water, oxygen and carbon in the state of carbonic acid, and hydrogen and nitrogen in the state of ammonia. The only class of plants that seems dependent for support on matter already organised is that of *Fungi;* a group of peculiar interest from their rapidity of growth, their universality of diffusion as dormant germs ready to be developed, and the importance of the offices they perform, like insects being denominated the scavengers of nature. The large quantity of carbonic acid which their absorbent system furnishes prevents the necessity of deriving any additional supply from the atmosphere. The proportion of nitrogen contained in their tissues is much greater than in any other vegetable, so that *fungin*, a proximate principle which may be obtained from them, is as highly azotised as animal flesh. Vegetables seem to constitute the intermediate link, in the scale of creation, between the Inorganic World and the Animal Kingdom; the latter being altogether dependent for its support, and even existence, on the Vegetable Kingdom."

According to Liebig, the food of animals consists principally of substances which are similar in composition to the tissues of the body. The vegetable fibrine or gluten, albumen and caseine, are similar to the same substances found in animals. They are also similar to each other, differing only in the quantity of saline earthy matters they contain, and have all for their basis the same proportions of carbon, hydrogen, oxygen, and nitrogen. This basis he reckons a separate substance, and it has been denominated *proteine* by its discoverer Mulder, who found that it was separated by potash from vegetable fibrine, albumen, and caseine, in the same way as from the same substances in animals. This substance, proteine, united to earthy saline substances, he says, is the basis of all the animal tissues, with the exception of the nervous, and requires only to be dissolved in the blood, and assimilated by each organ in its own way; chemical decomposition and recomposition not being required except for the formation of such as nervous matter. The non-azotised substances of the food, he says, are formed into bile along with the waste of the body, to carry on respiration, what is not presently needed being deposited in the state of fat, for future exigencies. Plants, on the contrary, require great chemical decomposition and recomposition, their food consisting principally of inorganic substances. It is, however, carrying simplification too far, to assert that organised substances form no part of their food. When organised substances are so far broken down by chemical decomposition that they become soluble, they will undoubtedly be absorbed and converted into food. I lately stated, in a former essay, the opinions of Professor Gazzin, that straw and other vegetable matter, broken down into small pieces by putrefaction, formed a main source of the food of plants. DeCandolle, also, says that soluble organic matter is taken up by the water absorbed, converted into carbonic acid in the plant, and this again decomposed in the leaf; carbon not being available, he states, in forming the sap of the plant, unless recently extracted, or in what is called a nascent state. Müller, page 40., says: "It appears from the experiments of Hassenfratz, Saussure, &c., that plants grow very imperfectly in carbonic acid and water alone, and that it is only when they are at the same time nourished by organic compounds in solution, *which have not wholly undergone decomposition*, that plants generate organic matter from binary compounds." The old opinion, that plants get their carbon *wholly* from the *air*, has lately been greatly upheld by the writings of Liebig, Dumas, and others; who, perhaps from a wish to simplify the subject, have given the weight of their opinions on that side. The former admits, however, that *young* plants get their carbon by the roots from the soil; and the latter notices the immense quantity of carbonic acid found by Boucherie to issue from the trunks of some cut down trees as rendering the subject doubtful. Schlieden, one of the most profound physiologists, seems to be of opinion that it is principally got by the roots from the soil, and appears doubtful of much being got from the air by the leaves. The water of the soil, he thinks, is generally saturated with carbonic acid; at ordinary pressure the water is capable of containing a quantity equal to its own bulk, and, where the pressure is considerable, much more. Dr. Mohl is said, in the *Chronicle* of 20th May, to have lately published similar opinions. It has been said that the fact of plants growing on bare rocks, newly thrown up by volcanic agency, is a proof of their getting most of their carbon from the air. The growth of such plants, however, cannot be called vigorous, and, besides, great part of their carbon is probably got from the rain water which feeds them washing down the carbonic acid of the air; volcanoes form also a great source of carbonic acid; it may abound in the fissures of such rocks, and every little pool of water on the rock will absorb carbonic acid from the air: the air above water always contains less carbonic acid from this cause. On the whole, therefore, it appears that though undoubtedly carbonic acid is absorbed by the leaves of plants, it seems wrong to say that it is wholly got in that way, and doubtful whether it is the principal source, much of what is got from the air being probably that washed down by the rain and absorbed by the roots. Some plants are no doubt able to prolong their existence without having their roots fixed in the soil; but the growth is not vigorous, and no practical man will be of opinion that it is of no use to bury the carbon of the manure in the soil. When a tree has its stem cut by the ground, if the roots are left untouched, the after-growth is so vigorous as soon to fill the former space, and even produce more wood than if it had been left uncut; but if the roots are cut off it languishes and dies, though supplied with moisture. Cuttings never grow much till they begin to root, and those that do so first in a pot of cuttings always outstrip and kill the others. In houses, from the air being confined, and not so frequently renewed, the carbonic acid of the air cannot be furnished in so great quantity; yet, if vines are well supplied at the root, they are not found to suffer from a want of carbon in the air of the house. Liebig, in his *Agricultural Chemistry*, says most of the carbon from the air to the leaves is probably from carbonic oxide; and this, from its being much lighter than carbonic acid, is probably the case. Carbonic oxide, as compared with atmospheric air, is only 0·972, carbonic acid 1·527, reckoning air as 1. Another source of carbon to plants is humic acid, which contains much more carbon than carbonic acid. From its extreme volatility and aptitude to change, and from its being seldom got in analysis of soils, Liebig and other chemists have stated their opinion that it cannot be a great source of carbon to plants, and that the humus of the soil is principally converted into carbonic acid. Professor Sprengel, however, who, with great scientific knowledge, appears to have studied the subject much in practice, seems to consider it a great source of food; and recommends the alkalies in composts, principally on account of their tendency to cause the formation of humic acid from the humus of the manure, in place of carbonic acid. In the excellent papers copied from his works into the *Gardener's Chronicle*, humic acid appears to be considered a most essential part of the composts he describes. The experiments of Dr. Madden, also, have thrown great light on this subject. He found that in passing ammonia through humus or soil containing humus, humic or ulmic acid was always formed in quantity corresponding to the ammonia introduced, and was found in the water drained off in the state of ulmate of ammonia. The action of ammonia on humus (or semidecomposed vegetable matter) in the soil is thus likely to be a constant source of carbon to plants, in the ulmate of ammonia absorbed by the water and introduced by the roots. To the contrary argument of its being seldom found in analysis of the soil, he replies, that, in soil where it is spread and mixed, the mass used for analysis is generally too small to admit of the minute quantity contained being perceptible; the soil also, he says, acts chemically on it when not directly taken up by the roots of plants, and absorbs the humus again till again acted on by ammonia. The excrements of plants probably contain nitrogen, from the fungi found parasitical thereon; and, as it will probably be in the state of ammonia, this may account for the action of the spongioles of plants on their food, so generally believed in, but which has hitherto eluded demonstration. This belief is strengthened by the fact that nitrogen is found to abound more in the roots than in any other part of the plant. At all events, there seem good grounds for believing that much of the carbon of plants is furnished to them in the state of ulmic or humic acid, which will be decomposed in the leaf, and give off oxygen similar to carbonic acid. It at least appears premature to assert that carbonic acid is the sole source, and much more so to confine it wholly to absorption by the leaves.

Nitrogen is so far indispensable to plants that no vegetable organ can be formed without it. Dumas says: "The researches of Payen have proved that all the organs of the plant, without exception, begin by being formed of an azotated matter analogous to fibrine, with which at a later period the cellular, ligneous, and amylaceous tissues are associated. This azotated matter, the real origin of all the parts of a plant, is never destroyed; it is always to be found, however abundant may be the non-azotated matter which has been interposed between its particles. This azote, fixed by plants, serves therefore to produce a concrete fibrinous substance, which constitutes the rudiment of all the organs of the vegetable." Liebig says: "When the newly expressed juices of vegetables are allowed to stand, a separation takes place in a few minutes. A gelatinous precipitate, commonly green, is deposited, and this, when acted on by liquids which remove the colouring matter, leaves a greyish white substance, the *vegetable fibrine*." Ammonia is to be found, he says, in an uncombined state in the juices of the plant, wherever life is most active. The preparation of this vegetable fibrine, so essential in the formation of all the organs, will be indispensably necessary before growth can proceed; and for this purpose nascent carbon, hydrogen, oxygen, and nitrogen will be required. It is probable that carbonic acid, water, and ammonia will, by their decomposition, form the principal source of these substances. Any organic matter absorbed in a semidecomposed state will likely be reduced to carbonic acid first, and the decomposition of humic acid will furnish the same products as that of carbonic acid. It is perhaps however too much to assert that binary compounds alone are capable of affording nourishment to plants; it has not yet been proven that the simple elements will not unite unless in a newly decomposed or nascent state, though undoubtedly the most suitable. Oxygen is absorbed in greater quantity than needed for respiration. Liebig says it is essential to vegetable life, and gives as the reason why stagnant water at the roots destroys plants, that it has lost its oxygen. Nitrogen is also soluble to a certain extent in water, and likely is partly furnished to the plant in this form. There are other binary compounds also, besides carbonic acid, water, and ammonia, which may constitute food. Air is found in all the vessels of plants, sometimes containing more oxygen and sometimes more nitrogen than usual, evidently showing it has been acted on by the organs of the plant; and in this way both oxygen and nitrogen may be supplied. The fact that beans and other crops carry off much nitrogen, without exhausting the soil, seems conclusive on the point that the nitrogen of the air is absorbed by plants; and is allowed by Boussingault and others. Sulphuretted and carburetted hydrogen, especially the latter, which Dumas describes as being generally equal in quantity to the carbonic acid of the atmosphere, are probably made available, especially in the volatile oils formed in leaves, fruits, and barks. Inorganic compounds, though consisting of more than two elements, are yet generally combined in binary forms, as acids with bases, &c., which are not decomposed into their elements before combining, as in organic combinations. Nitric acid, combined in quaternary forms of binary combinations with alkaline bases, as nitrates of ammonia, potash, soda, and lime, supplies undoubtedly sources of food also. The ammonia itself is generally absorbed in a quaternary form, as carbonate and humate of ammonia. The ternary compounds of gum, sugar, starch, &c., of plants, when they become or are rendered soluble in the water of the soil, will certainly be as available for food as the same substances stored up in the plant. It does not appear necessary that they should all be reduced into their elements; if soluble before being so, they may be decomposed in the plant; and so also with organic substances in general, whether ternary or quaternary. It simplifies and makes the subject easier of comprehension, to endeavour to confine the substances used as food to the fewest numbers possible; but in attempting this we may err in restricting the operations of nature too far, which are not generally confined to one particular method.

"It is a general law of vitality, that the materials of nutrition can only be introduced into the living system in the *fluid* state;

the ingestion of solid aliment by the higher animals does not contradict this principle, when the character of the nutritive organs are examined. Whilst the roots of vegetables ramify through the soil in pursuit of nutriment, animals, whose locomotive powers are necessary to search after food, may be said to carry their soil about with them, for their absorbents are distributed on the walls of the digestive cavity, just as those of plants are prolonged into the earth. This cavity is in all instances formed by a reflection of the external surface, and in the lower classes is merely a bag with one opening, which may be regarded as all stomach. The food is acted on mechanically by the motion of the walls, and chemically by the secretions poured from their surface separating the nutritious parts, and reducing them to a fluid form. The process of animal digestion has nothing to do with *organising* or *vitalising* the materials submitted to it. Some physiologists have regarded the possession of a digestive cavity as the most prominent characteristic of animals, but there is no doubt that many of the lower classes, during a part of their existence at least, are nourished by absorption from the exterior surface alone. The earth has been justly spoken of as the common stomach of vegetables; but the pitchers and traps of some plants approach the nature of a stomach, the insects appearing to serve as nutriment to them. In all cases, however, where previously organised matter influences the growth of plants, it is whilst in a decomposing state, and separated into its ultimate elements or very simple combinations of them. In animal digestion, on the contrary, the proximate principles of the food appear immediately subservient to the formation of others of a higher order, any tendency to decomposition being checked by the antiseptic qualities of the gastric fluid. The earth-worm and some beetles, which swallow earth, do so only to obtain the remains of the organised matter mixed with it. All the tribes of plants have their peculiar animals and insects which feed on them, and keep them in check; and all the classes of animals have their carnivorous tribes, adapted to restrain the too rapid increase of the vegetable feeders. Those animals which obtain their food with most facility seem least able to endure privation.

" It has been stated that all alimentary materials before being introduced into the living system must be presented to it in a fluid form. The changes involved in its passage through the membrane, or external integument, constitute the function of *absorption*. The transmission always takes place through some tissue of a membranous character, and never through open mouths of vessels. The skin of the higher animals, and the cuticle of plants, participate more or less in the function of absorption, even where a special absorbent system is provided; in the inferior tribes the external integument is its sole medium.

Mere capillary attraction has nothing to do with absorption, but the remarkable phenomenon to which the term *endosmose* has been given by its discoverer, Dutrochet, bears so strong a resemblance to this vital function, that it is scarcely possible to disbelieve its partial concern in it. If a solution of gum or sugar be put into a tube closed at one end with a piece of bladder or other membrane, and the closed end immersed in water, a passage of water will take place through the membranous septum, the solution in the tube being greatly increased in quantity and diminished in strength. At the same time there is a counter-current in the opposite direction, a portion of the gummy or saccharine solution passing through the membrane to the water, but in much less quantity. The first current is termed *endosmose*, and the counter-current *exosmose*. It is not universally true that the activity of the process depends on the difference in density of the two fluids; sometimes the stronger current is from the denser to the lighter; but with such as are generally contained in the roots of plants it appears to be so. No endosmose takes place between fluids which will not mingle, as oil and water, and very little between such as act chemically on each other. Organic membranes are the best septums, but lamina of pipe-clay will evidently produce the phenomenon also, and it appears that physical laws alone are concerned in it. The passage of fluid through the living membranes has been considered purely vital; but, if we regard the other vital actions as furnishing the *conditions* of endosmose, the absorption itself may be due to the phenomenon. After death, the quantity of fluid which first penetrates does not find the conditions changed as in vitality, and saturates the tissues, preventing the admission of more. When the fluid absorbed is drawn off for the purposes of the economy, a demand for a new supply is created, and the action becomes regular and subservient to life. From the different times which saline solutions take to pass, as prussiate of potass in 5 hours, sulphuric acid in 6 hours, acetic acid and muriate of soda in 24 hours, it appears that what has been termed the *selecting power* of absorbent surfaces is not due so much to their peculiar vital properties as to the physical relations between their tissues and the substances brought into contact with them."

(*To be continued.*)

Errata. — In p. 344. line 2. for "albumen" read "alburnum." In p. 352. line 8. from bottom, for "Con." read "edition."

ART. II. *On the Food of Plants, and its Transformation.* By ALEXANDER FORSYTH.

(*Continued from* p. 399.)

THINKING, therefore, that the formation of gas in the ground would be found the first and main spring in the accumulating of vegetable tissue, and consequently of every kind of garden produce, I bethought me of the means of raising this gas by holding the face of the earth up to the rays of the sun, and placing the requisite materials under the surface, in such a manner that when heat arose there might also arise gas, or something that had been gas, and was now vegetable tissue, in an active living form; and though some may think, from the ordinary methods of producing gas by the action of fire, that I should have had many a long summer day to wait before the sunshine should boil me up a gas out of garden earth to grow tissue in, I can assure such that the first cloudless sunbeam that comes upon the soil at right angles will not leave the mass in the same state as it found it.

Let us try a common lens, or burning glass, say of one inch diameter; and, out of the few rays that fall upon that surface, see if we cannot get such a quantity of heat, that when it is bundled together it makes a nice little fire. Ah! here then is a fire already kindled and to be relied on, provided we can find earth at right angles to its rays, and the materials to make the gas with. These two points therefore must set limits to my present enquiry, namely, the getting the materials to make the gas of, and the manufacture of it; or, in other words, the distillation of the spirit that is the food and life of the vegetable tissue, out of the ruins of any substance that may contain it, whether animal, vegetable, or mineral.

First, then, the getting of the materials; and, instead of giving a list of every substance and matter, clean or filthy, that might be made available for good manure, I will give an example of one, perhaps the most abused, most abundant, and the most valuable. I mean grass, whether young or old, short or long, in the form of old grass turf with the roots and soil, or young short herbage from the lawn, seven days old, and only one inch long.

Instead of putting this to the old score on the top of a hillock under a tree, as you have done at the Derby Arboretum, and as you saw done at Bicton, I put this valuable article into the mash-pool with as much care as if it were malt; that is to say, I put it under water to prevent its evaporation, and to get the essence or substance of it into the water. "Ah!" you will say, "this is a poor broth to feed plants on, green grass and water." Therefore, to do away with any erroneous idea on this head, and to bring this argument to bear upon every cottager who has a garden, as well as upon every professed gardener, I will assume that good cow-dung is allowed by all to be an excellent manure, and if the gardener, whether cottager or not, had plenty of this article, he would soon enrich his garden; but how to get cow-dung without the cow, and without buying it, ay there's the difficulty.

Well then, what do cows eat all the summer long? Only grass; and out of that grass they grow fat, give a great quantity of milk, and yield manure. This manure seems to be the draff or dregs, the worst and most worthless of the productions yielded from the grass. If then grass yields such valuable draff after it has been distilled and rectified in the stomach of the cow, what would not the *malt* (I mean the grass) do, if the spirit were left in it? Surely it would be better draff than ordinary; and it *is* too: therefore I mean to assert that very superior cow-dung may be manufactured from mown grass, without troubling the cows. Let it not be thought that grass is necessary: no! any green thing belonging to the vegetable kingdom, and the greener the better, will do, and if in flower it is to be preferred: but I must enumerate an example or two of the most abundant and available articles. Heath and fern, broom and gorse bushes, root and branch. These are the store-houses from which to draw manure. No more of the lazy trick of setting it on fire, as is done too often ; and a more diabolical act is scarcely to be conceived, than consuming by fire the valuable produce of the earth. Let any one take a waggon-load of heath in bloom, and chop it short, that is to say, to lengths of nine inches, and then put it into the mash-pool till it is thoroughly soaked with water, in which its own softer parts have been dissolved by maceration, and without any further preparation let this be drilled into the earth in the manner that Scotch and other farmers drill in their dung for turnips and potatoes; and if other ordinary culture and management are properly attended to, there will be good reason to hope for a remunerating crop of potatoes.

I am well aware of the tanning matter contained in the bark, &c., of wood, of which so much has been said and written; and I know that fresh tanner's bark is no manure; and, lest this idea should deter any from trying other macerated vegetable matter, I must be allowed to hint that, though fresh tanner's bark is no manure, yet rotten tan is proved to be a very valuable ingredient in the soil where young vines are planted, and when it is reduced sufficiently to pass through a riddle of a quarter-inch mesh. Let its merits be tried as vegetable mould in the culture of pot plants, as calceolarias, &c., and experience of its beneficial influence will, I have no doubt, soon mend its character. But it is not the macerated remains of any particular plant or tribe of plants that is to be taken as a sample of the sort of manure I am speaking of; it is the mass of mixed manure formed of the waste of vegetables, and preserved from evaporation and heating by being kept under water, instead of being thrown in a heap, dry or half-dry, as is usually done: and it is from distinct observation, for a series of years, of the store heaps that some Scotch farmers and others make who are anxious to grow turnips, that I have come to the following fixed points upon the subject, from which the foregoing and following conclusions were drawn.

The manure secured by these persons in the summer and autumn, when cast into a proper pit, and trodden down by pigs and other stock till it was quite firm and free from heating, came out the following June as green as if it had been in one of the well known preserve jars of Cox and Co. of Reading; whilst some other wiseacres had carted similar manure into a square heap on the headland of their turnip field in the frosty weather in winter, and by June the store heap (thus made in January) had lost certainly one third of its bulk, and more of its value. Therefore, manure should be made when we can, and preserved under water free from heat, for certainly it is one of those things that will take to itself wings and fly away; and I think, in many cases, the crop of leaves from such as an oak or the like may, if properly husbanded, be more valuable than the crop of fruit on an apple tree. When we consider that ever to be regretted waste of the finest manure, I mean night soil, it is no wonder that human beings want the fruits of the earth, when they stain the air with filth that might fatten acres for many a fertile year to come. Let any one try dry earth from his garden, dry fern from the woods, turves from the lanes, or any such absorbing stock, and when a cubic yard of this has lain in the mash-pool for one month, and has, by the agency of the water, become incorporated with one cubic foot of night soil, which is only one part to twenty-seven, he will find this a very strong manure ; and it is therefore no wonder that it was a little too strong both for the nostril and the garden, when it was twenty-seven times more concentrated. The waste then in that alone is ruinous to cottage gardening ; for, if a person has a cubic yard of this, a little management will make, without expense, twenty-seven cart-loads of manure out of it, and this twenty-seven yards would go far to give him an acre of turnips, &c. We have lately seen published the marvellous account of wheat having been grown upon a bare rock, the seed covered with straw only. Now it would certainly have been a very great wonder if it had not grown so; for rotten straw is no stranger for the roots of wheat to meet with and live by: and as the straw on the rock got wet and heat, it soon was much akin to my present macerated mass of vegetable tissue, and helps me out in the idea that such wasted culm is capable of being recompounded into perfect plants, available to the sustenance of men and animals. But a volume might be written on this subject, showing how the mash-pool would reduce the oak itself to vegetable mould by maceration and drying a few times repeated, and how peat, such as is used for fuel, might be enlivened from its inert state, and assimilated with some recent vegetable matter, as mown grass, thus becoming a valuable vegetable body, neither too vapourish, like the grass, nor too sullen, like the saturated mossy sod.

The grand point is the communication established by means of water, wherein the superabundance of one article, or property, of any ingredient becomes equalised and common to all the other bodies that may be mashed up with it. I need scarcely tell any one that the mash-pool is an isolated and very small pool, or rather tank, and that the materials in it are merely embedded in water, that is to say, enough to keep them nearly under water. Let no one imagine that to throw dirt into a large pool is the way to make good manure of it. I put water to it: I do not cast it on the waters.

Let us suppose, then, that a quantity of this manure, or indeed of any other, is got, we come to the beneficial employment of the same under ground. Now, it will scarcely be credited that such plants as the common onion will send their feeders six feet deep into the earth; yet such is the fact, as any one may satisfy himself of by giving them a trial; and, though I give this as a plain example, it is the case with innumerable other crops. Now, when the feeders find food (whether that food be gas, as I imagine, or any other grosser substance, no matter), there they extend and fatten the body of which they are the mouths. A field for these, therefore, is now our object: this field must be sunny in the highest degree, that is, the greatest amount of surface must be exposed to the sun, and that surface as much as possible at right angles to the stronger rays. I have often touched the surface of an oaken door with an eastward aspect and could scarcely bear my hand on it, even before breakfast on a sunny morning. Now this same sunshine was acting equally strong on the banks or ridges I am about to mention, whose lines, running north and south, left the beveled sides of their eastward slopes at right angles to the morning rays; consequently those ridges had the steam up, and the spongioles of the plants in them going a-head, and tissue forming in this hotbed before breakfast, and before the same rays could awaken the feeders of the plants growing on a flat surface, on account of the obliquity of the face of the soil to the sunbeams. I have no doubt but that it is to this source that the excellence of ridge and furrow drilled crops of turnips and potatoes is to be referred, and I have good reason to think that loosening the earth about many crops is of no service to them, but highly injurious; for I find from experience that hacking a thing half out of the earth and breaking and bruising its feeders, under pretence of loosening the soil about it, is not the way to forward its perfect developement. As the details necessary to establish this point would take me more time and pains than I can spare now, I will bear the odium of this hint, and be called " in error," if you please, till I can give the reasons for this way of thinking.

I now proceed to show the form in which garden soil should lie when bedded out for crops; and considering cottage as well as castle gardening, I shall take the potato crop for an example to illustrate the "Banking System" of culture.

Those who have made asparagus beds, such as you generally see about London, will have the idea at once; but to prevent error, I will give it in feet and inches. Divide the land into sections, or beds, of 4 ft. wide, with 2 ft. of an alley. Dig this bed, and, if necessary, dig in a good layer of dung; and, when this is dug nicely and deeply, lay the manure for the potatoes on the top of the bed, and plant one line of egg-sized whole potatoes down the centre, and one on each side, a foot from the centre: thus making three rows in a space (counting the bed and alley) of 6 ft.; which, in flat planting, would be

2 ft. from row to row. I mention this to show that there is no waste of room more than ordinary. The soil in the alley is now to be excavated, and laid on the bed from 4 in. to 6 in. deep: this quantity will therefore lower the alley at least a foot below its old level, and with the rise and the slope will give a slanting surface of 2 ft. facing the morning and evening sun at right, or nearly right, angles; and will give the 4 ft. bed a surface exposed to sun and shower of at least 7 ft., that is, three fourths more than flat beds, as shown in *fig.* 101.

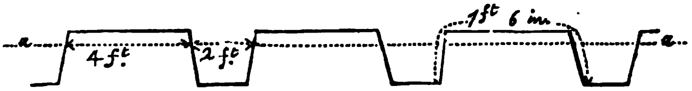

Fig. 101. *Section through Ground, showing that a much larger Surface is exposed to the Action of the Atmosphere by laying it up in Beds, than by retaining it in an even State.*

As there is no earthing-up wanted, you have no deep hacking and hoeing; and, be it remembered, as the land is only once on the spade, no double digging or trenching. If the weeds between the rows were to grow as they might, they could never choke the crop, because they are beggared for want of manure in the first instance, for there is not a forkful between the beds; and, if they start with or before the potatoes, they will have at least 18 in. to grow before they come to the level of the ground line where the potatoes spring from. I have given this system a fair trial on the worst of land, and with various crops, as potatoes, onions, &c., and have no doubt of its superiority, especially on ill drained stiff clay, which it goes far to correct and cure, being a regular summer fallowing: and in the case of shallow land, for carrots or the like, the depth can be doubled by making the alleys wider, and thus laying one half on the other; for the air will circulate between the beds equally well for the crops, whether the alley be rich mould or barren sand.

Begging pardon for this lengthy explanation, I must conclude by saying I have spoken from experience; for I have cultivated several acres in this way for years past, and have detailed the system with truth and faithfulness for the benefit of those who have no better way, begging those who know better to help their neighbours, and me their humble servant.

Alton Towers, St. Andrew's Day, 1842.

ART. III. *Arboricultural Notices.*

QUE´RCUS *pedunculàta frúctu longíssimo*, or *glánde longipedunculàta*, the long-fruited common oak, is a variety strongly marked both in its foliage and fruit. The general form of the leaves is lanceolate, compared with those of the common oak, widest in the middle, and equally pointed at both ends; and the lobes are acutely pointed. Length of the leaves 6 in., and breadth in the widest part 1¾ in; length of the acorn, taken out of the cup, 1⅜ in., breadth ¼ in. The tree from which, through the kindness of M. Charles Rauch, we received a specimen and some acorns, is in the Imperial Park at Laxemburg, near Vienna, where it is 60 ft. high, with a trunk 4 ft. in diameter. We have distributed the acorns, but are very doubtful whether, after having been kept so long (July 25.), they will grow.

Trees at Smeaton, near Dalkeith, the property of His Grace the Duke of Buccleugh, measured by order of His Grace for the *Arboretum Britannicum* in December, 1838, but inadvertently not forwarded.

Cèdrus Libàni, with a trunk containing 115 cubic feet, and 15 limbs containing 91 ft.; in all 206 ft.

Castànea vésca, containing in the trunk and limbs 146 cubic feet; another sweet chestnut, containing in the trunk 165 cubic feet, and in the limbs 101 cubic feet; in all 266 ft.

Pinus sylvéstris and Pinus uncinàta one and the same species.—We never had the slightest doubt of this, having often seen both in Scotland and England (in the grounds of Syon House for example) hooked cones, and cones with the scales not hooked, on the same tree. A hooked and plain cone have lately been sent us from a young tree at Hendon Vicarage, by the gardener there, Mr. William Lawrence, a proof, not only that *P.* sylvéstris and *P.* uncinàta are not different species, but that they are not even varieties.

ART. IV. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the CONDUCTOR.

(*Continued from* p. 409.)

VIII. COUNTRY CHURCHYARDS; THEIR PRESENT STATE, AND MEANS OF IMPROVEMENT.

WHAT traveller or tourist is there that does not make the churchyard of the village one of the first scenes which he visits; and does not receive from it his first impressions of the clergyman, the people, and consequently of the general character of the inhabitants? If such be the effect of a glance at the churchyard on the passing stranger, what must it be on those to whom its image is constantly present, and by whom it is associated with all that is reverential in feeling? To the local resident poor, uncultivated by reading, the churchyard is their book of history, their biography, their instructor in architecture and sculpture, their model of taste, and an important source of moral improvement. Much, therefore, must depend on the manner in which churchyards are laid out, and the state in which they are kept. A country labourer may not have the habits of attention and observation sufficiently developed to derive improvement from the style or taste displayed in the architecture of the church; but there is not one countryman that does not understand the difference between slovenliness and neatness, between taste and no taste, when applied to walks, grass ground, and gardens. All of them, therefore, may have their taste for neatness and order improved, or their habits of slovenliness confirmed, by the weekly impressions made on them while passing through the churchyard to the church; and, while their habits of life are thus improved or deteriorated, their hearts are softened and ameliorated, or hardened and diseased, by viewing the graves or monuments of their friends and relations neatly kept or utterly neglected, and reflecting that they also must soon take their place among them and be neglected in their turn. The intellectual and moral influence which churchyards are calculated to have on the rural population will not, we think, be disputed. Every person, indeed, who has been brought up in the country must feel this. How far then does the appearance of our churchyards answer the important educational ends which they are calculated to effect? It will not be denied, we think, that very few of them are kept in a manner to answer the end proposed, and that a very great many are in a state of deplorable neglect. In many cases we find the lawn and pleasure-ground of the clergyman displaying the greatest order and neatness, while his churchyard has no care bestowed on it; or is perhaps disfigured by the state of the surface, or the want of repair of the surrounding

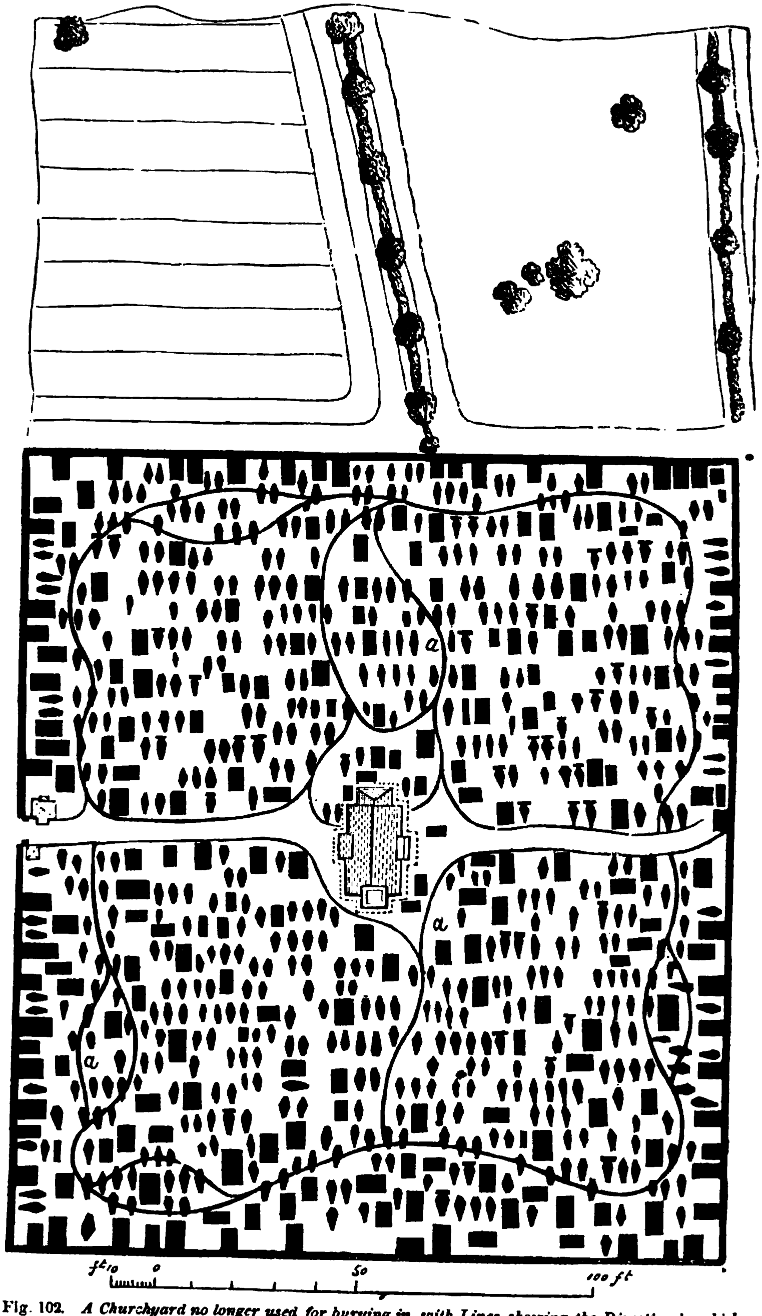

Fig. 102. *A Churchyard no longer used for burying in, with Lines showing the Direction in which Walks may be made, without removing any Head-stones or other Monuments.*

fence. But the wretched state of the churchyards has been, perhaps, sufficiently dwelt on both in this and in other publications, and we shall therefore confine ourselves to pointing out the causes of their present state separately, and suggesting the modes by which these causes may be removed.

Want of Order.—The cause of this evil in churchyards is, that they have not been originally laid out on any regular or systematic plan. Not only is there no gravel or paved walk round the churchyard in many cases, but in some there is nothing more than a footpath from the yard-gate to the door of the church. In many churchyards it is too late to remedy this evil in an effectual manner, but we have never seen one in which it might not be removed to a considerable extent, without that which at first sight seems absolutely necessary, levelling the turf mounds over the graves. This is to be avoided by bringing in soil sufficient to raise the space between the grave mounds to a level or even surface, varying the direction of the walk, and expanding, contracting, branching, divaricating, and inosculating it, so as never to disturb a gravestone or any description of stone monument. The idea of such a walk is given in the sketch *fig.* 102., in which it is indicated by the lines *a a;* and the effect, after the trees have been planted, is shown in *fig.* 103., p. 479. In this figure is also exhibited an addition made to the old ground, laid out in a regular manner. In the interior of the ground, grass paths ought to be formed to the graves to which there is not direct access from the gravel walks, to enable spectators to view the tombs without the appearance of treading on graves. The walk would seldom require to be raised more than 18 in., and it ought to have a grass margin on each side of the same height as the gravel, of at least 2 ft. in width. Where a flat gravestone was to be crossed over, it might be raised up to the proper level; some other descriptions of stone might be sunk; and, in cases of great difficulty, a gravestone might be crossed by a bridge composed of a flag-stone of the width of the walk, supported on two piers; but such would be of rare occurrence. When they did happen, advantage might be taken of the circumstance to make a raised seat, which would give a bird's-eye view of part of the churchyard; or a handsome open structure might be erected in harmony with the scene, and suitable for taking shelter in, or for strangers to witness the performance of a funeral. We never saw a case where a bridge would be necessary; but we suppose one, in order to show the resources of this mode of improvement, and, if possible, to convince our readers that there is not a churchyard in the country that might not be surrounded with a gravel walk, leaving a border between it and the wall; provided the clergyman and the other parties whose duty it is were to set earnestly about it. Cross green paths might be formed 2 or 3 feet in width, and they may be even more irregular than the surrounding gravel paths.

Another source of disorder and also of waste ground in churchyards is, that no systematic plan has been laid down and followed in allotting the graves. The graves are put down at random, leaving spaces between them either too narrow for graves, or of shapes so irregular that they cannot be filled up, so that in many churchyards a large proportion of the ground is thus rendered useless. It most frequently happens that the places are chosen by the deceased during their lifetime, or by their friends afterwards; and, some persons having partialities for particular parts of the ground, especially high and dry parts, the graves are crowded together in such parts, while in others there are comparatively few. Many persons have an objection to being buried on the north side of a church, probably from the comparative dampness and gloominess of that side as compared with the south side. Hence we often see the south side of a churchyard crowded, while the north side is comparatively without graves. The radical cause of this evil is the placing of the church in the direction of east and west, in consequence of which a considerable portion of the churchyard is in shade during the whole of the winter, and the greater portion of every day throughout the year, whereas, had the church been placed in the direction of S. W. and N. E., or of N. W. and S. E., the sun would have shone on every side wall of the church, and consequently on the ground on every side of it, every day in the year on which he appeared, and hence the churchyard would have been every where equally dry and inviting.

Every grave is a parallelogram in plan, and for practical purposes these parallelograms may be considered as all of the same length and breadth. It is obvious, therefore, that, to get as many of these parallelograms as possible into a limited space, they ought to be placed in rows side by side. Supposing the walks to be bordered with spaces sufficient for a single or a double row of graves, as we have recommended for adoption in laying out cemeteries, then the interior should be laid out in double beds, in the manner which we have already described as calculated to make the most of any given space (see *fig.* 35. in p. 158.). The beds need not in every case be regularly formed like the beds of a garden; but, whether this is done or not, they should be marked off with sunk stones at the angles and at each end of the central space on which the gravestones are to be placed, in order that the true position and dimensions of the beds may never be doubtful, and may never undergo any change through the carelessness of the grave-digger. An arrangement of this kind would not hinder parties from choosing graves in any part of the ground as at present; while it would prevent the great waste of surface that now takes place, and obviate the necessity of ever walking over graves, either to look at gravestones, or for the performance of funerals. In whatever manner a churchyard is arranged, leaving the choice of ground free is decidedly advantageous, both in point of utility and appearance. In point of utility, it is better that the whole of the churchyard should be open to the choice of the parishioners, and thus the graves scattered over it, and consequently the water and the gases of decomposition diffused over a large underground space, and thus diluted and weakened, than that they should be concentrated in one spot, and their bad effects aggravated; and it is more picturesque to have the graves and tombstones scattered here and there over the whole ground, than to have one part closely filled with graves and tombstones, and all the remainder without any.

Want of Perpendicularity in the Monuments and Gravestones.—From not placing the head-stones and other monuments on secure foundations, they are, in almost every churchyard, seen leaning in all directions; and, when composed of more than one stone, the joints are cracked, and the whole threatens to fall in pieces. This is an evil which admits of a remedy both with a view to the past and the future, without the slightest degree of desecration, though the expense of resetting monuments in a churchyard crowded with them might be found inconvenient. With respect to monuments to be erected in future, it will be sufficient for the manager of the burying-ground to insist on the monuments being placed on solid ground, or on a sure foundation of masonry or brickwork, as deep as the grave, as already indicated with reference to cemeteries in p. 156.

The slovenly State of the Grass and Herbage is the next evil which we shall notice. The surface of most graveyards is covered with long grass and rank weeds; and, though this is apparently a less evil than those which have been mentioned, it is in reality a greater one, because its removal requires little or no outlay. Hence it bears on the face of it the most unequivocal marks of negligence and slovenliness, instead of setting an example of neatness, care, and respect. In crowded churchyards the soil, from the water of decomposition, is necessarily rendered much damper than in ordinary ground, and it is proportionately richer. Hence the extraordinary vigour of the grass, docks, nettles, thistles, brambles, &c., and other large plants, which it produces; and the annual decay of this vegetation, saturated with the gases which emanate from the masses of putrefaction below, must be productive of malaria, more or less according to circumstances. The unoccupied corners and those parts of churchyards most distant from the eye, or from their dampness or other causes least frequented, are particularly obnoxious in these respects; and hence one of the great advantages that would result from having every churchyard surrounded by a

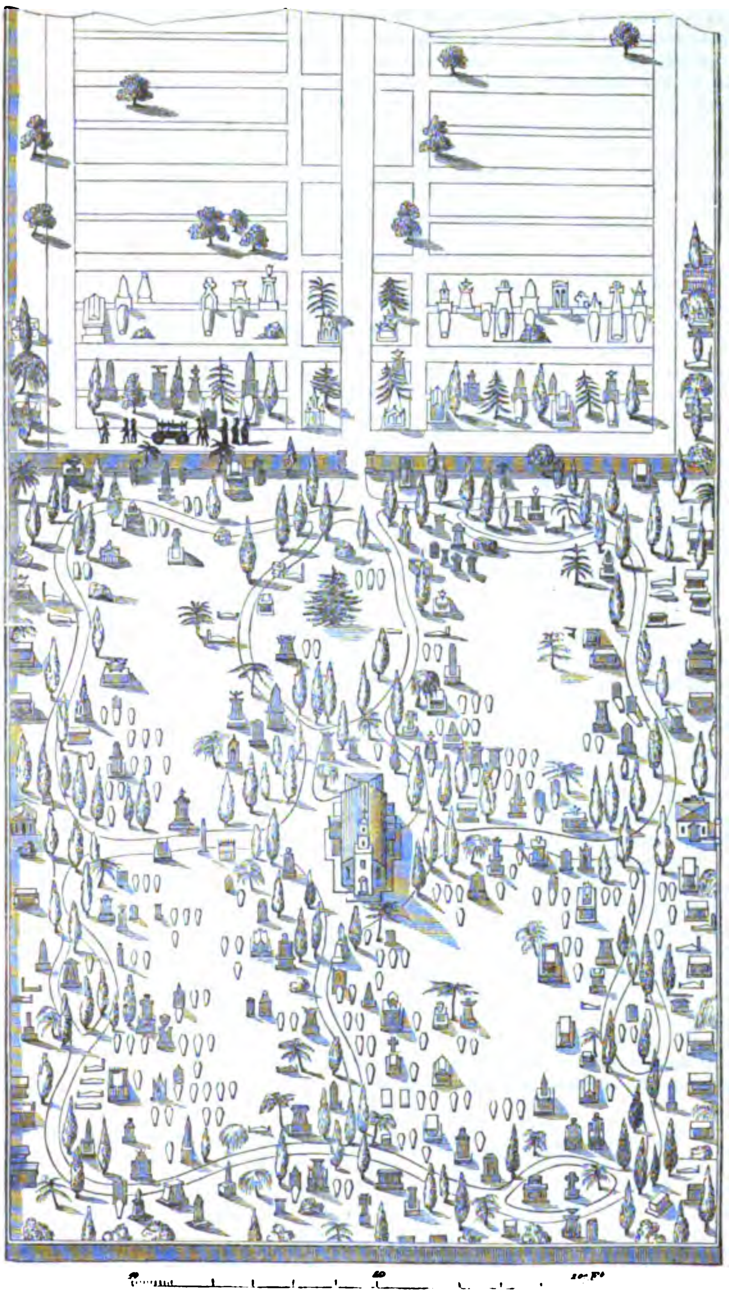

Fig. 103. *A Churchyard no longer used for burying in, planted as a Cemetery Garden, and a new Piece of Ground added and laid out.*

gravel walk, with a border between that walk and the boundary fence. The next remedy for the evil of rank grass and weeds is, to carry off as much as possible of the surface water. This may be effected by forming the surface in such a manner as to favour the descent of the water which falls on it to gratings connected with drains, or to surface gutters, which shall carry the water out of the churchyard. The tile-draining system may in many cases be applied under the green paths and gravel walks; and, where there are springs, it is almost needless to state that deep underground drains should be made under the main walk. By thus effectually drying the surface, the grass will grow much less luxuriantly and be easier kept under by mowing, clipping, or shearing, than when left in the moist state now so general in churchyards.

The grass should be kept constantly very closely cropped, by the scythe, the hedge-shears, the sheep-shears, or the hook. In some churchyards the grave mounds are so clumsily made, and laid up in such rough lumps, that it is difficult to mow the grass which grows on them, and in this case the reaping-hook or shears ought to be used. In most parishes there are aged persons, male or female, who would gladly undertake this work; and a very good mode of getting it executed would be to divide the ground into portions, and let out the keeping of each portion to persons whose pride it would be to keep their charge in as high order as possible. By this means some interest would be given to what is now a heartless kind of labour, and the competition would insure efficiency. The mowers or clippers would soon discover that the shorter they kept the grass the less it would grow, and the less would be their labour. Clipping, however, would only be necessary occasionally; for, wherever the grave mounds are neatly formed and smooth on the surface, they may always be mown with the scythe, which is much better than cropping with the reaping-hook, the mouth of the operator in the former case being so much farther from the soil and its exhalations.

In some churchyards sheep are admitted with a view to crop the grass, which they do effectually when in sufficient numbers, and when aided by the spud to eradicate broad-leaved coarse-looking plants which sheep will not eat; but, as in the case of sheep being admitted into churchyards, it is impossible for any person to ornament a grave with shrubs or flowers, and, as the poor have frequently no other means of showing their respect for the dead, we would prohibit the introduction of sheep into churchyards except where a portion of the ground had not been buried in, and that portion we would separate from the rest by a fence of wire hurdles, and keep it short by sheep to save the expense of mowing.

Desecration.—Not only sheep, but cows, horses, and swine, are admitted to graze the churchyards in some places; and, in the intellectual town of Haddington, the minister of the cathedral burial-ground not only allowed his sheep to graze in the churchyard, but carted in turnips to them there, and fattened them for the butcher. In many parts of the country, particularly in Scotland, the boundary fences of churchyards are in such a state that swine and dogs have free access to them, and the former are allowed to tear up the grave mounds, and even to burrow into the graves. Where houses are built on the margins of churchyards, as they frequently are in small country towns*, the waste water and other refuse from the house are thrown from the windows among the graves; and, shocking as it may be to relate, in some parts of

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* The churchyard of Carlow is in the centre of the town, and so closely surrounded by tenements, that in some places the wall of the dwelling-house, often loosely built, alone divides the bed of the occupant from the (perhaps newly tenanted) grave; this, although rendering the air sufficiently insalubrious, is not the only cause of impurity, as the annual decay of noxious plants, luxuriant in a place so rank and untrodden as our graveyards, universally neglected, are, where vegetable decomposition above ground is as much a consequence as animal decay beneath, injures most seriously the surrounding atmosphere. (*Health of Towns*, p. 197.)

Scotland, as there are no privies, either public or private, for the common people, the churchyard is the place of common resort. That we may not be accused of exaggeration, we shall refer to the burying-ground of the established church in Stranraer, as it was in 1841. A more hideous spectacle of the kind we never saw; but it is doubtless in a better state now, because the Earl of Stair, with his accustomed liberality and public spirit, has since presented the town with a piece of ground for a general cemetery; and is about to erect another structure for public convenience equally necessary. Bad as the churchyards are in England, they are much worse in Scotland; for there the extra-professional pursuits of the clergy are more frequently directed to farming than to matters of taste.

The charnel-house, or bone-house, needs only to be mentioned to excite disapprobation; for, if churchyards were properly managed, no fragment of a coffin or human bone would ever be disinterred or seen by the living. There are two modes of effectually attaining this object: the first is by never placing more than one coffin in a grave; or, if more are placed in it, either interring them at the same time, or placing the first coffin so deep as to admit of a stratum of 6 ft. in thickness between it and the second coffin; the last-deposited coffin, in either case, being not less than 6 ft. under the surface of the ground: and the second mode is by placing on the last-deposited coffin a guard, or following stone, as already suggested in p. 98.

Allowing public passages to be made through churchyards is a common source of desecration; but, as these passages are generally conducive to the convenience of the living, they cannot be dispensed with; therefore, to prevent desecration, they ought to be fenced off on each side.

No kind of games ought ever to be allowed in churchyards, nor dogs admitted if possible, nor smoking, nor in short any thing that would indicate a want of reverence for the dead.

By far the greatest desecration which takes place in churchyards results from their crowded state, in consequence of which a grave cannot be dug without disinterring coffins and bones. There is no remedy for this evil but the enlargement of churchyards, which is required in every part of the country, and should be effected from time to time, according to some principle or rule derived from the population returns, and the average annual burials.

Want of Trees and Shrubs.— We have often stated it as our opinion, that country churchyards might be greatly increased in interest, by being carefully and systematically laid out, and moderately planted with proper kinds of trees and shrubs. These being named would create a great interest in them, and the whole of the ground being very neatly kept would diffuse a taste for order and neatness among the parishioners. This improvement is beginning to take place in various parts of England, though but rarely in Scotland, where flowers are considered light and gaudy, and where the great object to be attained is to subject the mind to the bondage of fear, by continually reminding the spectator that "he also must die*, and that death is only the door to everlasting life." (*Gard. Mag.*, 1842, p. 617.) Far be it from us to dispute the justness of this taste, relative to those who hold particular opinions; for our own part we prefer the decorated churchyard, but we would no more decorate it in the manner of a flower-garden, than we would dress a mourner in the same manner as a bride or a bridegroom.

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* "From whence you come, or whosoe'er you be,
Remember, mortal man, that thou must dee."
Lines on the Sundial in the Garden at Brougham Castle.

"Alas! the little day of life
Is shorter than a span,
Yet black with many hidden ills
To miserable man."
Lines on a common Tombstone in Kirkmichael Churchyard, Wigtonshire,

one of the most gloomy scenes of the kind in the West of Scotland: it contains "the corpse of Gilbert McAdam, who was shot by the Laird of Cullean and Ballochmill, for his adherence to the word of the Lord, and the work of Reformation, in July, 1682."

We shall show at the end of this article the mode in which we think trees and shrubs ought to be introduced in new churchyards, and for those already long occupied we shall give a few general directions.

Suppose a walk to be formed immediately within the boundary, leaving a border, regular or irregular in width, as the state of the graves and gravestones may admit, then a few trees may be scattered along each side of it, singly, so as to form a running foreground to the interior of the churchyard, and to break the formality of the boundary fence. As the walk may be supposed to be very irregular in direction and in width, the distance between the trees should be irregular also; and occasionally two trees, or a tree and a shrub, or a tree and a honeysuckle or other climber, may be planted in one hole. In the interior of the compartments, where the ground is already so completely filled up that there is no chance of any other graves being formed, a few trees and shrubs may be so placed as to group with some of the more conspicuous of the gravestones, and along the cross green paths one or two trees may be planted at the angles or turns of the walk, by way of accounting for these turns. But, whether in planting in the interior or along the green paths, care must be taken to preserve lengthened glades or vistas to be seen from the main gravel walks. These vistas should not extend from one boundary wall to the other, so as to show everywhere the length and breadth of the ground, but should rather terminate in an apparent mass of trees or bushes, or in a view of the church, so as to leave abundant exercise for the imagination. Along the boundary fence, if a wall, which is generally the case, we would plant creepers, evergreen and deciduous, but chiefly the different kinds of ivy, as being evergreen, and Virginian creeper, *Rhùs radìcans*, &c., which, like the ivy, adhere to the wall, and consequently require little care. Where the expense of training was not an object, we would introduce roses, magnolias, laurustinus, *Cydònia japónica*, *Chimonánthus fràgrans*, and various other shrubs, deciduous and evergreen, adapted for walls. Where the fence was a thorn hedge, we would measure it into regular spaces, so as to train up shoots from the top of the hedge at regular distances, in order to form artificial heads, round or square, at such places; or we would train up a single stem, and graft on each a different kind of thorn, or other rosaceous tree or shrub. On a holly hedge we would graft variegated hollies, and on a yew hedge the golden yew, which makes such a splendid appearance grafted on the common yew at Elvaston Castle. If we had to plant a holly hedge or a yew hedge round a churchyard, we would form piers or pilasters at regular distances in both, which should be carried up higher than the hedge, and terminate in balls. The piers, in the one case, should be variegated hollies, and in the other variegated yews. If we had to plant a hawthorn hedge, we would form the piers of green holly.

Where a churchyard, though long in use, was not yet filled up, we should take care to plant no trees and shrubs, the permanent effect of which was essential, in situations where they would have to be removed when a grave was dug. We should place them chiefly along the walks, at such distances as to leave room for one or two graves between every two trees.

In few or no cases would we plant large-growing deciduous timber trees in churchyards, such as the oak, ash, elm, beech, white or black Italian poplar, Huntingdon willow, alder, sycamore, &c.; because, from the size they attain, they would interfere with the effect of the church and of the monuments. We should confine ourselves to low-growing trees, and, where only a few could be planted, to evergreens of fastigiate forms.

Want of Monuments.—Monuments form a great source of beauty and interest in churchyards, and it is gratifying to observe, in the neighbourhood of the metropolis and of other large towns, that as they increase in number they are improving in taste. Every encouragement, we think, ought to be given to their introduction in village churchyards, on account of the effect which they cannot fail to have on the taste of the inhabitants, and more particularly on all those connected with the building arts, such as carpenters, masons, bricklayers, &c. It seems unfortunate that the revenues of the clergy are made to depend partly on the permission granted to put up monuments, and thus a man is taxed for his reverential feeling, and for erecting an instructive and beautiful object, which he would, probably, have rendered more beautiful still by the amount of fees paid to the clergyman.* A better mode would be to encourage the erection of monuments, by giving the ground as a present on condition of the monument being proportionately handsome. We would encourage every kind of monument, from the most frail to the most permanent, as tending to cultivate reverential feelings and improve the taste; and we would encourage the naming of all the trees and shrubs, as tending to excite curiosity and intellectual exercise.

The churchyard at St. Michael's, at Dumfries, is perhaps the most remarkable in Britain, on account of the number and good taste of its tombstones. The appearance of these at a distance is singularly grand and picturesque. Erecting tombstones at Dumfries is quite a mania among the middle classes, which has been brought about chiefly by the cheap and easily wrought red freestone, and the talents of the late mason and sculptor, Mr. Alexander Crombie. The cheapness of these tombstones, compared with the price of similar erections about London, is so great, that we are persuaded they might form a profitable article of commerce for the metropolitan cemeteries. To enable those concerned to judge how far this may be the case, we give, through the kindness of Walter Newall, Esq., architect, Dumfries, figures from the designs of two monuments, not long since erected at the heads of the graves of two nurserymen, Messrs. Hood, father and son; that of the father (*fig.* 104.) cost 38*l.*, and that of the son, William (*fig.* 105.), 25*l.* The carriage to London, by Whitehaven, we are informed, would not amount to 5*l.* for each of these monuments. (*Gard. Mag.* for 1831, p. 529.)

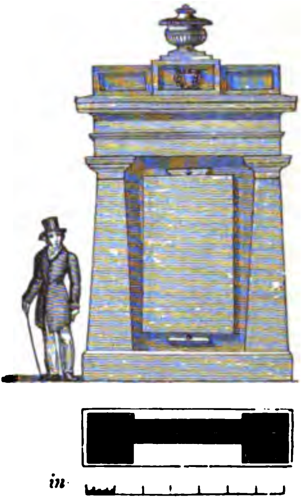

Fig. 104. *Monument to Mr. Hood, sen., in Dumfries Churchyard.*

The improvement of the church is chiefly the business of the architect; but the gardener may in various cases cooperate with him, or even supersede his exertions. It is desirable in all cases that a church, like every other large building, should stand on a level terrace or platform; but, as most old churches are buried or earthed up by graves in such a manner as that the ground is higher without than it is within the church, this platform or terrace can seldom or never be formed, without incurring a degree of desecration that would be unjustifiable. Still, in a majority of cases, a space round the walls of the church might be cleared away to the width of 2 or 3 feet, and of such a depth as to be at least 6 in. below the level of the floor of the church. This space ought to be carried completely round the church on a perfect level, or with merely a very gentle inclination from the middle of the building to each end, for the purpose of carrying off surface water. Under this space there should be a tile-drain within a few inches of the surface to carry off rain water, or a deep drain if the subsoil requires it. The ground round this narrow level platform should either be supported by brickwork or sloped down with turf, according as the graves are nearer or more distant; and both the width of the platform and the angle of the slope may be irregular, if circumstances should require it. The grand essential object is to get a level base for the walls to rise from, the surface of which shall be 6 in. lower than the surface of the floor of the church. The walk to the church door will require to descend to this platform by an inclined plane, and there will of course be one step of ascent to the porch of the church.

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* The fees for permission to erect the simplest and cheapest of all stone memorials placed by graves, a head and foot stone, vary in the London churchyards from 2*l.* 2*s.* to 6*l.* 6*s.*; for permission to place a flat stone over a grave, from 4*l.* 4*s.* to 12*l.* 12*s.*; and the price for more ambitious monuments varies from 5*l.* 5*s.* to 105*l.* For the right to erect "stones and vaults" in the Hackney churchyard, though it was greatly enlarged some years ago, from three to forty guineas have been paid. (*Claims of the Clergy*, p. 25.)— See *An Examination of Mr. Mackinnon's Bill*, p. 117.; *Cauch's Funeral Guide;* and *Health of Towns*, &c.

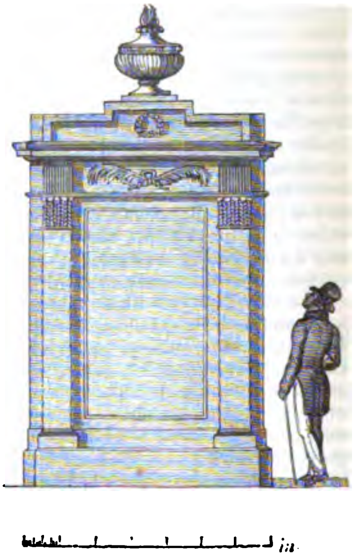

Fig. 105. *Monument to Mr. Hood, Jun., in Dumfries Churchyard.*

It is unnecessary to state that the walls and roof of the church should be kept in good repair, and that in many cases ivy and the Virginian creeper might be planted against it; but we cannot recommend roses and other plants requiring dug soil at the roots, on account of the injury they would do to the platform, and the expense that would be incurred in training. It is always much better not to attempt to do more than can be done well.

Perhaps it would greatly facilitate the improvement of churchyards, the erection of handsome monuments, and the economy of burial to the poor, if the fees of the clergymen from the church and churchyard were commuted for a fixed sum to be raised annually by a general rate on the parish; but this is a part of the subject not within our province.

Laying out and planting a new Churchyard. — Churchyards, like every other description of yard or garden, ought to be laid out, planted, and managed, with reference to their use; and the scenery produced should, in its expression and general effect, indicate what that use is, or, at all events, be in accordance with it. A churchyard ought not to be laid out so as to be mistaken for a pleasure-ground, a shrubbery, or a flower-garden; neither, on the other hand, ought it to be left in a state of utter neglect, without regular walks, and overgrown with weeds and rank grass. The uses of the churchyard are, as a place of burial, as an enclosure and protection to the church, as a place sacred to the memory of the dead, as a place of weekly meeting for solemn purposes, and as an approach to the church. All its uses are of a serious and important nature, and it is therefore to be considered as a grave and solemn scene. Now, the question to be solved in laying out a churchyard is, what trees, what treatment of the surface of the ground, the grass, walks, graves, gravestones, and tombs, will be most conducive to solemnity of effect. The expression of the exterior of the church is grave and solemn, by its long-established association with our religious feelings; and it therefore may be considered as having a similar influence on the scenery around. The feeling of solemnity is one more of a passive, than of an active, nature: it neither needs much cultivation, nor much exercise of the imagination. Strong contrasts are not required to excite this feeling, nor varied and intricate scenery to prolong it. On the contrary, this will be more decidedly the effect of sameness of form and colour, and their repetition. The solemnity of a churchyard has its origin in the uses of the place, and will only be interfered with or weakened by the introduction of such objects as interfere with these uses. Simplicity, therefore, ought to be a governing principle in every thing relating to churchyards; and, as the appearance of neglect or slovenliness always implies want of respect, order and neatness are next in importance. By order, we mean the avoiding of every thing like confusion in the placing of the graves, tombs, and gravestones, and the disposition of the trees: and, by neatness, we allude more particularly to keeping the turf short and smooth; the walks firm, even, and free from weeds; the gravestones upright; and the tombs in a state of repair.

The character of a churchyard, as a place of burial, will always be more or less influenced by the character and manners of the people to whom it belongs. In Britain, churchyards have much less care bestowed upon them than in Central Germany, and in some parts of France, Belgium, and Holland. The sentiment of respect to the memory of deceased persons in these countries is shown by planting flowers over the graves, and frequently cultivating them there for some years afterwards. Among the Moravians, on the Continent, the churchyard is sometimes laid out in compartments, with walks between, like a garden; and the compartments are kept dug, and planted with flowers and ornamental plants. Two powerful arguments are advanced in favour of this practice: the first is, that a churchyard so managed costs less than if it were in turf, and kept short by mowing; the second, that the surface of the ground has always the same appearance, there being no gravestones or tombs, and the ground being left level, and replanted with the plants which stood on it before, after every interment; these having been carefully taken up, and placed on one side, before the grave was dug. It is evident that this mode of treating a churchyard, however consonant it may be to the ideas of those who adopt it, is not in accordance with our desiderata. It does not indicate its use, as it has neither raised graves, tombs, gravestones, nor any other appearance of its being a place of burial; and it is not calculated to excite solemn emotions, as it has all the gaiety of a flower-garden.

In Britain, respect for the dead is not generally shown by the introduction of flowers over their graves; but the practice prevails in some places throughout the country, more especially in Wales, and is not unfrequent in the metropolitan and other cemeteries. Perhaps it ought to be commended and encouraged, as rendering burial-grounds inviting as places to walk in, and as the frequent recollection of deceased friends has a tendency to sober the mind and cultivate the affections of the living. In every part of Germany where the inhabitants are in the habit of cultivating flowers on the graves of their friends, or even of visiting these graves annually on a certain day and decorating them, the inhabitants are a reflective, and very humane and amiable, people; for example, at Munich. The introduction of flowers in churchyards, therefore, where they are planted over the graves by the relations of the deceased, is a very different thing from their introduction in the margins of plantations of trees and shrubs, in imitation of shrubberies, as is done in some of our public cemeteries; to the utter neglect, as we think, of appropriate character and expression.* Bearing in mind, therefore, the three principles of simplicity, order, and neatness, as guides in laying out churchyards, we shall next proceed with the details.

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* Hanover Chapel, Brighton, has a burying-ground which is quite unique. A straight avenue of elm trees leads from the entrance gate to the door of the chapel; and on each side of the gravel walk, which runs down the centre of the avenue, is a narrow margin of smooth highly kept grass. Next there is

Situation and Soil.— It is almost unnecessary to observe that a country church ought either to be built adjoining the village for which it is intended, or, if it is to serve two or three villages, in a situation central to them. The surface of the ground ought to be an elevated knoll, in order that the church and the spire may be seen on every side, and, if possible, throughout the whole extent of the parish. The knoll should be sufficiently large to admit of its summit being reduced to a level, or, at all events, to a nearly level, platform, or piece of table land, about the size of the churchyard; a level surface being more convenient for the purpose of interment than a sloping one, for a reason that will be given hereafter. Besides which, the ground plan of a church being a parallelogram, to see it rising out of a round knoll would be contrary to every idea of a suitable and secure foundation. Where there is no want of room, or not many burials likely to take place, the surface of a churchyard, instead of being level, may be quite irregular; but, in this case, the places for graves, and the walks of communication to these places, must be rendered easily accessible, and, to a certain extent, level. This can always be effected by laying the ground out in terraces; a mode of disposition which may be as advantageously adopted in churchyard gardening, as it is in gardening as an art of culture. The soil should, if possible, be sandy or gravelly, as being most suitable for promoting animal decomposition; and also because there is a general prejudice in favour of being buried in dry soil. The worst of all soils for a churchyard is a stiff wet clay; which, by its compactness and retention of water, prevents the natural decomposition of the body, and changes it into an adipose substance.

The Size of the Church, and the Extent of the Churchyard, will depend on the population for whose service they are intended; and on the probable slowness or rapidity of its increase. The form of the church may be considered as fixed, by precedent and immemorial usage, in that of a parallelogram, with or without projections at the sides, so as to give it the form of a Latin cross; and having a tower, steeple, or cupola, at one end, for the church bells and a clock. There are some examples, however, of churches having been made semicircular, circular, or polygonal, in the plan, so as to suit them to particular situations.

The form of the churchyard is not fixed, like that of the church, but will

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on each side a neat low wire fence, and beyond this is the burying-ground, the greater part of which is dug and planted with herbaceous plants, interspersed with low trees and flowering shrubs, and divided by walks, in some places straight, and in others winding. The whole is interspersed with graves and gravestones; and, as the gates in the wire fence are all kept locked, no person is allowed to walk among the graves who is not admitted by the gardener. Every recent grave is covered with a mound of green turf, kept smooth by clipping or mowing, and all the rest of the ground is kept dug and planted; so that no flowers can be said to be grown on the recent graves, but only beside them. The recent graves are those in which interments have taken place within two or three years; and are always known by being covered with green turf, which is kept fresh by watering, and short and thick by frequent mowing. Nothing that we ever saw in a cemetery or churchyard comes up to the high keeping displayed in this one. The walks and their edges were perfect; the grass every where like velvet; the dug ground as fresh and garden-like as if it had been recently dug and raked; the flowers neatly staked and tied up, where tying was required; and not a single decayed flower or leaf could we observe any where. The boundary walls were covered with ivy and other climbers, and we observed trained on them one or two fig trees and some other plants of the tree kind; but, as in consequence of the wire fence we could not get into the interior walks, we speak only of what we saw from the avenue. (*Gard. Mag.*, 1842, p. 349.)

naturally be determined jointly by the form and position of the church, and the form of the ground which surrounds it. If the ground be level, or nearly so, then the outline of the churchyard may coincide with that of the church, so as also to form a large parallelogram, in the direction of east and west, that being the prescribed bearing of all Christian churches. There is, however, as we have already seen (p. 477.), a great disadvantage in placing the church so as to bear east and west, which is, that the north side, both of the church walls and the part of the churchyard next them, is kept great part of the year in the shade, and the ground is consequently rendered damp, and uninviting to bury in. We are happy to find that in some parts of the country the advantage of a diagonal bearing is beginning to be understood and acted on, both in dwellings and churches. Indeed, no single building or row of houses, or street, should be set down in the direction of east and west, unless there is some very decided reason for doing so.

If the church be situated on the summit of a conspicuous conical hill, or dome-like knoll, then the outline of the churchyard will be determined solely by the ground, and may be circular, oval, or roundish; and we may here observe, that, when cases of this kind occur, as they are not very common, we think the ground plan of the church ought to be round, or roundish, also. In general, the position and form of the churchyard ought to be such as will have a good effect from all the different parts of the surrounding parish from which it is seen; while, at the same time, it should look well from its immediate vicinity, and also from the different doors and sides of the church.

The Site of the Church should be central to the natural shape of the ground which is to constitute the churchyard, when that shape is in any way remarkable; but, where the surface of the ground is level, the church may be placed nearer one end of the parallelogram, or other-shaped piece of ground, which forms the churchyard, than another; or even nearer to one side, provided this is not attended with injustice to the parishioners. In general, the exact position of the church within the churchyard, when not determined by natural circumstances, ought to be regulated by the number of sides on which it is approached. If the parish lie equally round the church on every side, there will be at least four gates to the churchyard, corresponding with the four cardinal points; and in that case the church ought to be in the centre of the churchyard; but, if there be only a gate at one end, or if there should be several gates all nearer one end than the other, the church ought to be placed accordingly.

The Ground Plan of the Church, its exact position in the churchyard, the boundary lines of the latter, and the different churchyard doors or gates being fixed on, before any thing farther is done, the church ought to be built; and we shall suppose that its elevation is so designed as to appear to rise from a platform of gravel or pavement, of from 10 ft. to 20 ft. wide, according to the size of the church; this platform, or terrace, being supported by a sloping bank of turf, at an angle of 45°, and furnished with flights of steps opposite each of the churchyard gates. Underneath the surrounding platform there ought to be a deep barrel-drain or box-drain, for receiving the rain-water from the roof of the church, and thus keeping the foundations dry; and from this drain there ought to proceed others of the same kind, under each of the walks which lead from the church platform to the boundary wall. These last, besides carrying away the water collected in the drain which surrounds the church, will dry the subsoil of the churchyard generally, and enable it the better to absorb the water of decomposition; and receive the surface water from the walks, through gratings placed at regular distances.

The Boundary Fence of the churchyard should be such as to exclude every kind of domestic quadruped; but it is not, in general, necessary that it should be so high as to prove a barrier to man; because it may fairly be supposed that most persons will reverence the interior more or less, and that those who are without this reverence will have, in general, nothing to gain by breaking into such a scene. We here exclude altogether the consideration of body-stealing, which a recent judicious law has rendered no longer a profitable business, more especially in country places As swine and rabbits are particularly offensive in churchyards, especially where the soil is sandy, the boundary fence should either be a low wall of 3 ft., surmounted by a holly or thorn hedge; or a wall of 6 or 7 feet in height, without any hedge. In the latter case, the inner face of the wall may be planted with common ivy. Where the churchyard is to be united with the adjoining lawn, garden, or pleasure-ground of the parsonage, the boundary fence on the side next the residence may be an open iron railing; and, where it is to be united with a pleasure-ground on a large scale, or a park, it may either be surrounded by an open iron railing, or by a deep and wide sunk fence. If a hedge is in any case determined on as the boundary to a churchyard, it ought to be kept much broader at bottom than at top, in order that it may grow quite thick and close there; and the only plants fit for such a hedge are the common white thorn and the holly.

The Walks of a Churchyard are of two kinds: those for proceeding from the different gates in the boundary fence to the church doors, for persons going to, or returning from, the church; and those which make the circuit of the churchyard, for the more conveniently viewing the tombs and graves, and for conducting funerals. The walks proceeding from the entrance gates in the boundary fence to the church doors should be always in straight lines, and of a width proportionate to the size of the church and churchyard, but never narrower than 6 ft.; because this is the least width which will allow two persons abreast, carrying a coffin between them on handspokes, to pass solemnly along; the width, indeed, should be greater rather than less, because nothing can be more indecorous than to see a funeral procession crowded and huddled together for want of room. In every case, we would, if possible, place the entrance gates so that the walk from them to the church, whether to its sides or its ends, might always meet the building at a right angle.

With respect to the walk round the churchyard, it should in every case, and whether the churchyard were small or large, be at a distance of at least 10 ft. from the boundary wall, in order to leave a border sufficiently broad for a range of graves to be placed at right angles to the wall. This walk should be of the same breadth as the others; and, like them, in no case less than 6 ft. for the reasons already mentioned. In most churchyards this boundary walk, and the cross walks necessary as approaches to the church, will be sufficient; but, where this is not the case, cross walks from the boundary walk to the terrace round the church may be added; or a second surrounding walk may be formed, half-way between the terrace or walk round the church, and the circumferential walk.

The grassy Surface of a Churchyard, when it is newly laid out, should, of course, be even; and the nearer it is to level, the more convenient will it be for all the purposes of interment. Whether even or uneven, it should always have a descent from the church, rather than towards it, for the sake of throwing off the surface water; and in strong clayey soils, in moist climates, provision ought to be made by surface gutters, even in the turf, for conveying the water to underground drains, or directly along the surface to the boundary of the churchyard.

Trees in Churchyards.—The number of trees which may be introduced into a churchyard depends on its situation and soil; the great object, next to that of leaving abundance of room for the graves, being to preserve dryness, in order to permit the escape of the mephitic effluvia that may rise to the surface, which can only be effected by the admission of abundance of light and air. Where the soil is clayey, and the situation low, very few trees are admissible; and these few should be small fastigiate-growing kinds, that neither cover a large space with their branches, nor give too much shade when the sun shines. In an elevated open situation, where the soil is sandy or gravelly, the trees in a churchyard may be comparatively numerous; because the shelter which they will afford in winter will produce warmth to persons crossing the churchyard to church; and, from the airiness of the situation, and dryness of the soil, they will not produce damp when their leaves are on in summer, but will freely admit of evaporation from the surface.

Supposing a new churchyard to be planted, we should place the trees chiefly at regular distances, in rows parallel to the walks. There are very few churchyards that would bear more trees than a row on each side of the circumferential walk, and also on each side of the walks leading from the entrance gates to the church doors; while, in cases of limited extent, and a clayey soil, a row of trees, planted at regular distances along the boundary fence, will, perhaps, be as many as can be introduced without producing damp; and, in others, a few trees along each side of the principal walk from the entrance gate of the churchyard to the church will, perhaps, be enough. It must not be forgotten, that the principal part of the area of a churchyard, in general, lies from east to west; and, consequently, that all trees planted in that direction will throw a shade upon the ground the greater part of every day that the sun shines, throughout the year. For this reason, where the soil is so damp, or the situation so confined, as to render it advisable to introduce but very few trees, these ought either to be in lines along such of the approaches to the church terrace as lie in the direction of north and south; or to be introduced as single trees, at the intersections of the cross walks with the boundary walk.

The kinds of trees to be planted in a churchyard form a subject of as great importance as their number; because a single tree of some species will produce more bulk of head, and consequently more shelter, shade, and damp, than half a dozen trees of some other kinds. As a guide in the choice of the kinds of trees, it may be adopted as a principle, that none ought to be planted which will grow higher than the side walls of the church; because to conceal the church by its appendages or ornaments is inconsistent, not only with good taste, but with common sense. By good taste, in this instance, we mean allowing the church to have its proper expression, as the principal and most dignified object in the landscape. Thorns, hollies, maples, sycamores, yews, mountain ash, wild service, &c., are suitable trees for the churchyards of very small churches; and the common maple, some species of oaks, such as the evergreen oak, the Italian oak, and some of the American oaks, with a host of other middle-sized trees, are suitable for the churchyards of churches of the ordinary size. There are very few country churches, indeed, which have even their towers or spires sufficiently high to admit of the stronger-growing elms or poplars being planted in their churchyards. The Oriental plane (not the Occidental) may be especially recommended, on account of the stone-like hue of its bark and foliage, its finely cut leaves, and agreeable shade, for churches of both the largest and the middle size. The purple beech would harmonise well in churchyards with the dark yew; and the flowering ash is, also, a very suitable tree.

As all trees in churchyards must be liable to have their roots injured by the digging of graves, this is one grand argument for planting the trees alongside the walks; because in that case there will be always one side of the tree the roots of which will remain untouched, viz. those which spread under the walk. For the same reason, trees with roots that spread near the surface, such as the pine and fir tribe, should seldom be made choice of. Were it not on this account, the cedar of Lebanon would be one of the most fitting of all trees for a churchyard, from the sombre hue of its foliage, and its grand and yet picturesque form; from the horizontal lines of its spreading branches contrasting strongly with the perpendicular lines of a Gothic church; and, above all, from the associations connected with it, on account of its frequent mention in Holy Writ. For all these reasons, it were much to be wished that, in all new churchyards, two or three spots (each of about 30 ft. in diameter) were set apart, not to be broken up for interments, and each planted with a cedar of Lebanon. In many old churchyards in the country, a spot sufficiently large for at least one cedar might easily be spared; and the clergyman or the churchwardens who should plant a cedar on such a spot, and fence it sufficiently while young, would confer a grand and appropriate ornament on the church, and would deserve the gratitude of the parishioners.

No trees should be planted in a churchyard the natural habit of which is to grow near water, such as willows, alders, &c.; because the expression conveyed by such trees, being that of a moist situation, is altogether unsuitable for a churchyard; nevertheless, as the public in general do not participate in these associations, one of the most popular trees in churchyards every where is the weeping willow. On the whole, the cypress, the yew, the Irish yew, the red cedar, the Swedish and Irish junipers, the *Juníperus recúrva*, the Oriental arbor vitæ, the different species of thorns, the common Montpelier, mountain, and other maples, the wild service, the whitebeam tree and its hybrids, the holly, and a few others, are the most suitable low trees for churchyards; next, those which grow about the height of the Norway maple; and, lastly, those which rank in point of size with the Oriental plane.

The System of Interments in Churchyards is, in general, very imperfect; and, indeed, in many cases no system whatever is adopted. The obvious principle is, to place the tombs near the eye, and consequently near the walks; and to place the graves without gravestones in the interior of the compartments. For this reason, we would reserve a strip of ground, 10 or 12 feet in width, along both sides of the walks (which would include the whole of the space between the boundary walk and the boundary wall); these strips should be devoted exclusively to family burial-places, whether merely indicated by corner stones, or railed in, or containing gravestones or tombs. The whole of the compartments being thus bordered by strips for family burial-places or purchased graves, the interior of each compartment might either be laid out in strips parallel to the borders, with gravel walks between; or devoted to graves without marks, laid out in the manner of a garden, with regular alleys of turf between. The manner of arranging these graves, and all the regulations respecting them, should be much the same as those recommended for cemeteries, p. 158.

In Germany, it is customary, in some churchyards, to bury all the children under a certain age, who are not to have grave-marks, in a compartment by themselves; not only because the waste of ground occasioned by placing large and small graves together is thus avoided, but because it is found that, in the case of children, the ground may be used again much sooner than the ground in which adults have been buried. But we do not think it necessary to recommend such a practice for Britain, where churchyards are, or may be, increased in size with the increase of population; and where it is desirable that no grave should be opened after it has once been filled.

On the Continent, as well as in many parts of Britain, the extent of the churchyard in country parishes remains the same as it was several centuries ago; the consequence of which is, that, in districts where the population has increased, the graves are crowded together so as to obliterate one another, and the ground raised considerably above the surrounding surface, as well as above the floor of the church. Every time a grave is dug in such churchyards a great number of bones are thrown up; which are deposited in the first instance in the charnel-house, and, in many cases at least, sold afterwards to bone collectors, who ship them to Britain, along with the bones of quadrupeds, to be crushed for manure. (See *Gard. Mag.* for 1842, p. 546.)

Fig. 107. is the ground plan of a churchyard laid out agreeably to the foregoing principles; and *fig.* 106. is an isometrical view, supposing the trees to have been ten or twelve years planted, and some of the gravestones and tombs to have been erected. The churchyard is of small size, and is adapted for an agricultural parish, where the majority of the inhabitants are in moderately good circumstances, and whence it is supposed the superfluous population will migrate to the towns, and leave the number of permanent inhabitants comparatively stationary. There is only one entrance to the churchyard (at *a* *fig.* 107.), over which there is an archway for the protection of persons waiting during rain or snow. The walk is 8 ft. broad, and proceeds direct to the steps

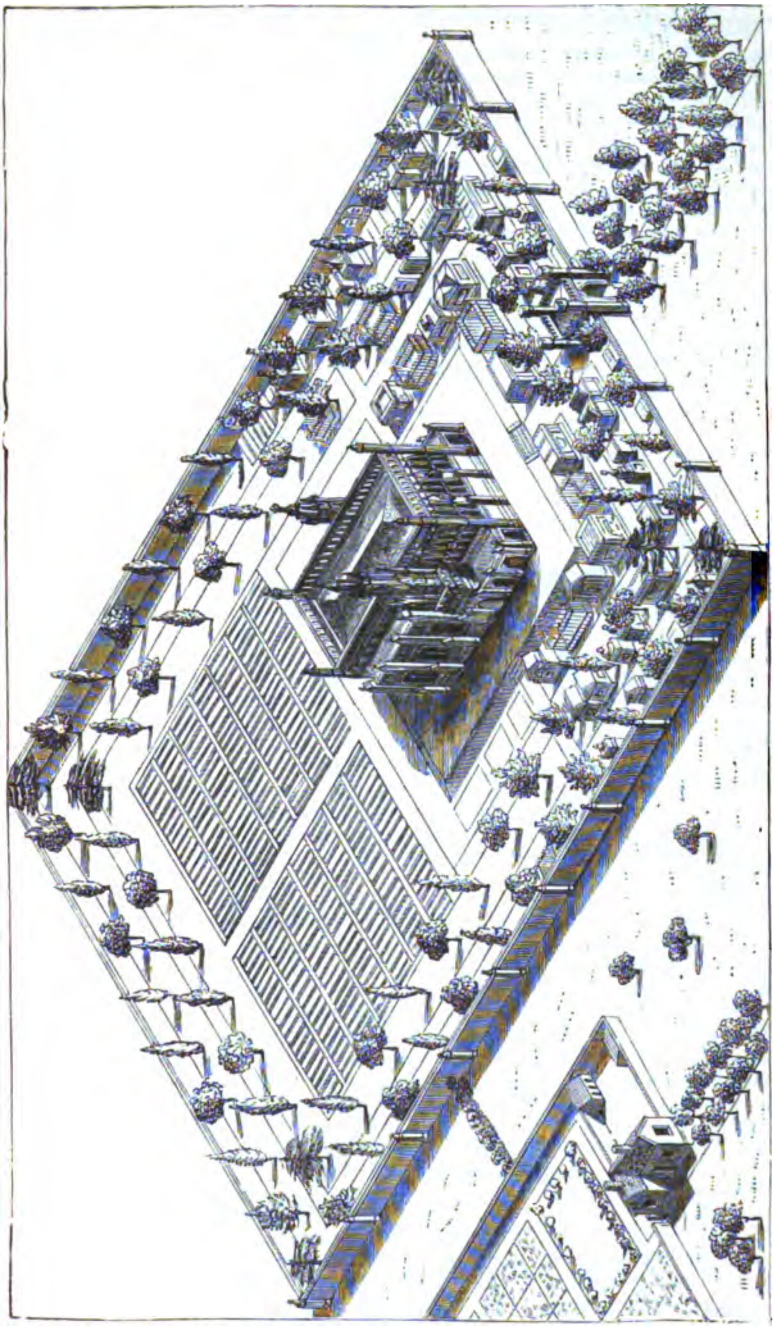

Fig. 106. Isometrical View of a Churchyard adapted for an agricultural Parish.

(*b*) which ascend to the platform on which the church stands. The circumferential walk (*c*) is 6 ft. wide, with a border for tombs and gravestones on each side, 12 ft. wide. There is also an inner walk (*d*) of the same width, between which and the platform on which the church stands there is another 12 ft. broad for tombs. The space for graves without marks lies on each side of the walk *e*, and is in 14 divisions, with room in each for 24 graves. Each of these divisions is separated by a grass path 2 ft. wide. The two surrounding borders, intended for tombs, are planted with trees 20 ft. apart. At the angles (*f f*), these trees are cedars of Lebanon; at the main entrance (*g g*), they are yew trees; and the remainder of the trees are different species of thorns (*C*ratæ'gus) (*h*), and evergreen cypresses (*i*), alternately; except opposite to the side entrances to the platform, and at the angles adjoining the cedars, where there are yew trees marked *k k k k*. Whatever tree is introduced on one side of the walk, the same sort is also planted on the other; for the sake of preserving uniformity in the perspective. The number of trees wanted for this churchyard will be 8 cedars of Lebanon, 20 yews, 28 cypresses, and 32 plants of *C*ratæ'gus. The latter may be of the following 16 species or varieties: —

C. coccínea.
C. c. corállina.
C. punctàta.
C. Crús-gálli.
C. C. *s*alicifòlia.
C. orientàlis (odoratíssima).
C. tanacetifòlia.
C. t. Cel*siàna.*
C. *A*rònia.
C. *O*xyacántha *r*òsea.
C. *O.* múltiplex (flòre plèno).
C. *O.* melanocárpa.
C. *O.* præ'cox.
C. glandulòsa.
C. heterophýlla.
C. flàva.

Half the yews may be of the upright Irish variety; but the cypresses should be all of the common upright-growing kind. In many parts of England, and generally in Scotland, the climate is too severe for the cypress; but in all such places the Irish yew, Irish juniper, Swedish juniper, weeping Nepal juniper (*J*uníperus recúrva), the upright-growing variety of the Oriental arbor vitæ, or the *P*ìnus *Cémbra*, may be substituted. The common holly is also not a bad substitute; and, if deciduous cypress-like trees were required, we know of none more suitable than the *Q*uércus pedunculàta fastigiàta and the *C*ratæ'gus *O*xyacántha strícta.

The parties wishing to bury in the borders are not to be considered as obliged to erect tombs of any sort, or even to enclose the spot which they have purchased with an iron railing; all that they will be held under obligation to do will be, to confine their operations within the limits of the parallelogram which they may purchase (and which may be either single, as shown in the plan at *t*, or double, as at *u*), and the four corners of which will be indicated by four stones let into the soil at the expense of the parish. The party purchasing the ground may erect any description of gravestone, tomb, statue, or monument, he chooses within it; or he may leave it in naked turf, which will be mown or clipped at the expense of the parish; or he may plant it with shrubs and flowers, in which case he must keep it in repair himself. We have suggested the idea of not rendering it compulsory to erect tombs or iron railings, in order that we may not seem to exclude those who cannot afford the expense of such memorials, from purchasing a grave to hold in perpetuity. A poor man may be willing to afford the price of a grave, in order to preserve the remains of his family from being disturbed; though he might not be able to afford the farther expense of decorating it, by setting up a gravestone or erecting a tomb.

The Church shown in the figures is on what is supposed to be an improved design, suggested by an architect in the *Architectural Magazine*; and it differs from the ordinary plan of churches in the manner of the entrances, and also in the general form being nearer that of a square than is usual. The author of this plan adopts it as a principle, " that the point in the outer walls from which each pew, and each class of pews, can be gained by the shortest pos-

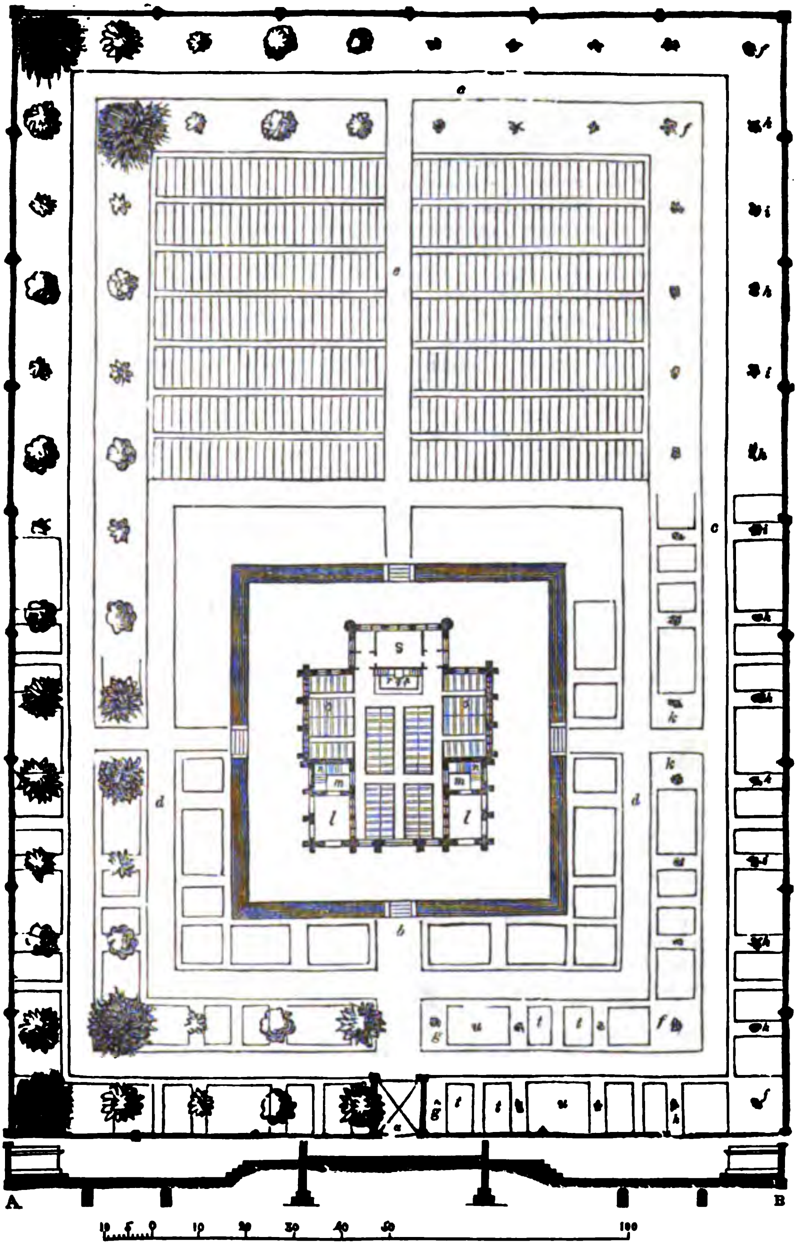

Fig. 107. *Ground Plan of a Churchyard adapted for an agricultural Parish.*

sible distance, is the best situation for an entrance; and for the following reason: that a person entering a church after the congregation has partly assembled, or, as frequently happens, after service is commenced, may gain his sitting as soon as possible, and avoid at least one half the disturbance otherwise created, by having only half the length of an aisle to traverse." With respect to the general form, this architect considers "that plan the best which concentrates the greatest number of benches or pews within a given distance of the preacher; and hence he prefers a square to a parallelogram." He adds: "Never let the inner entrance door of a church open under a gallery, or the effect of the interior of the church will be irrecoverably lost. If you will have western entrances and western galleries, contrive to have porches or cloisters, so as to take you to the gallery front before you enter the body of the church." (*Arch. Mag.*, iv. p. 568.) The ground plan in *fig.* 107. is made in accordance with these principles: *l l* are the entrance porches; *m m*, staircases, from which the body of the church is entered through lobbies at *n*. The inner lobbies are formed by two pairs of folding doors, with a space between, equal to the thickness of the walls of the towers which contain the stairs. The inner doors of the lobbies may be glazed with stained or painted glass. If the body of the church be fitted up with benches, the effect would harmonise better with this style of architecture; and, in the opinion of several clergymen with whom we are acquainted, this arrangement would be more suitable to the spirit of Christianity, according to which all are equal in the sight of God. It is worthy of remark, that in the Russian churches there are no benches or seats of any kind whatever, and nothing to prevent the meanest slave from standing by the side of the highest noble, or even of the emperor himself. The portion of the sittings marked *o o*, to the right and left of the pulpit, our architect considers should be free. The communion table is to be placed at *p*, the pulpit at *q*, and the reading-desk at *r*. "The vestry and singers' seats (*s*) should be divided from the body of the church by a pierced screen, finished upon the same level with the gallery fronts; and above this screen should be a niche and canopy to the pulpit, designed as much as possible to improve the sound." (*Ib.*, p. 571.) Whoever wishes to enter into farther detail on the subject of churches, and to see plans and elevations on a large scale of the one shown in *fig.* 106., may consult the *Architectural Magazine*, vol. ii. p. 393., vol. iv. p. 237. and p. 566., and vol. v. p. 223.

The *Parsonage House and Grounds* will, in general, be most conveniently situated adjoining the church and churchyard; and the church will always form a most appropriate object in the principal view from the parsonage. The churchyard, also, may sometimes be seen as a part of the view; and at other times it may be so united with the grounds of the parsonage as almost to seem a continuation of them. In the greater number of situations, however, we believe the clergyman will prefer having his residence at a short distance from the churchyard; not only from the idea that there may be mephitic exhalations from it (especially in churchyards where the graves are crowded pell-mell together, and opened without any regular system), but also because familiarity with the interments taking place in it may lessen the sentiment of solemnity excited by them in his children and domestics, and may obtrude that expression more powerfully than is desirable upon the minds of strangers who may be his guests. Another and a decisive reason why the church and churchyard should generally stand alone is, that the expression of solemnity is heightened by this circumstance. Solitariness is unquestionably a powerful ingredient in all feelings which are the opposite to those of gaiety; and, on this account, the church and churchyard should stand completely isolated, and, as we have said before, they should, if possible, be so elevated as to be seen from all the surrounding country. (See the subject of Parsonage Houses treated of in the *Suburban Gardener*, p. 607. to p. 615.; in which the plan of Dunchurch Vicarage, laid out from our designs in 1837, is given as an example of the pleasure-grounds of a parsonage united with the scenery of an adjoining churchyard.)

Art. V. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By James Barnes, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 436.)

Letter XIX. *Crane-necked Short-handled Hoes.*

I now give you an account of the different uses I make of my little crane-necked hoes. (*fig.* 108.)

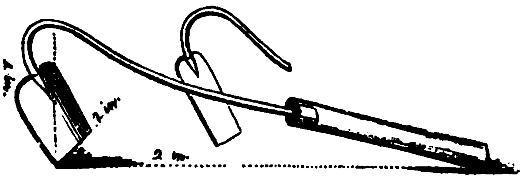

Fig. 108. *Crane-necked Hoes.*

Nos. 1. and 2., in *fig.* 109., I use for cutting and thinning out all kinds of vegetable crops to their final distance, such as carrots, early turnips, parsneps, onions, lettuce, &c.; and for stirring the surface amongst any growing crops, where there is not room for a larger hoe.

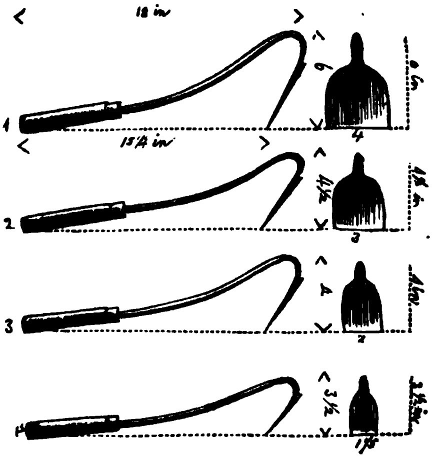

Fig. 109. *Elevations of Crane-necked Hoes.*

Nos. 3. and 4., in *fig.* 109., are for the same purpose, the first time of thinning; and for hoeing such crops as do not require to be made so thin, as well as among all kinds of plants that are pricked out, such as celery, cauliflowers, broccoli, cabbage, &c.

Nos. 5. and 6., in *fig.* 110., I use for all kinds of seed beds; for radishes, carrots, &c., in frames and pits; for small seedlings just pricked out in frames, pits, under hand-glasses, or in hooped beds; amongst peas in rows, when they first come up; or any other small crop where there is not room for wider hoes, and the surface requires breaking. I make it a rule never to have any hand-weeding done, except in the gravel walks; as I am well convinced there is much mischief done by incautious and thoughtless people weeding amongst crops.

Nos. 7. and 8., in *fig.* 110., I use for stirring the surface of potted plants, seed-pans, &c. No. 8., with a sort of pointed blade, I find very useful for moving the soil round the rims of the pots, to clear out any obstruction that is likely to prevent a free diffusion of water.

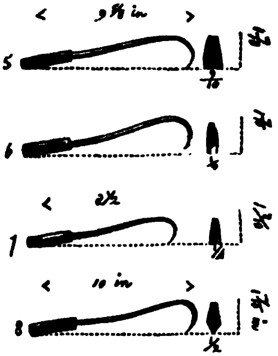

Fig. 110. *Crane-necked Hoes of the smaller Sizes.*

I well know it is an idea many people have, that it is loss of time to hoe before they have a crop of weeds; and they have encouraged their growth for a considerable time, as if they were in some fear of losing the stock of them. In good cultivation a weed ought never to be seen. I do not agree with those that tell us one good weeding is worth two hoeings: I say, never weed any crop in which a hoe can be got between the plants; not so much for the sake of destroying weeds and vermin, which must necessarily be the case, if hoeing is well done, as for increasing the porosity of the soil, to allow the water and air to penetrate freely through it. I am well convinced, by long and close practice, that oftentimes there is more benefit derived by crops from keeping them well hoed, than there is from the manure applied. By keeping the surface of the earth clean, open, and healthy, nature supplies herself: it is not only the means of eradicating weeds and vermin, but through it (stirring the soil) vegetables profit in every way; they are clean, healthy, and of a finer flavour. Had not our country produced weeds, I am apt to think, we should never have thought of using the hoe, or any other fertilising tool. My rule is to hoe, fork, and stir the surface, at every opportunity, when it is in a proper state for performing these operations. Weeds or no weeds, still I keep stirring the soil; well knowing, from practice, the very beneficial effect which it has. It is attended with little trouble, and only requires to be adopted as a system. Raking the surface fine I have almost wholly dispensed with, in every department, as I have plainly seen the ill effects of it many times; and this is a season it must be much felt, particularly on all kinds of heavy soils: the heavy rains will run the surface together, and bind it so as to become caked, "livery," and "steely." [See p. 429.] By hoeing with judgement and foresight, the surface can be left even, wholesome, and porous; and three hoeings can be accomplished to one hoeing and raking. Much injury is done by raking the surface so very much, in more ways than one. It is not only the means of binding and caking the surface, but it clears the stones off as well. The earth in its natural state has stones, decayed roots, and vegetation, to keep it open and porous, and, by their decomposition, gradually to add to the earths of the soil. It also contains naturally numerous insects, worms, and moles. If the earth is sufficiently drained, either naturally or otherwise, and the surface kept open, there is no fear of suffering either from drought or moisture; and it is healthy for the animal as well as the vegetable kingdom.

Bicton Gardens, June 6. 1843.

ART. VI. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 445.)

THE design, *fig.* 111., is for the distribution of a collection of herbaceous plants according to the natural system. It has been carried into execution in the Vice-Regal Gardens at Monza, near Milan, by Signor Giuseppe Manetti, the director of these gardens. To this distinguished honour M. Manetti, who has been our correspondent for many years, has been recently elevated; and the appointment appears to us to do equal honour to him and to his royal master.

The ground possesses no advantages in point of form or surface, and is rather limited. If the area had been of greater extent, M. Manetti observes, the genera would have been separated from each other by a line of different-coloured plants, such as Armèria vulgàris; but there was no room for any thing of this kind. The plants included in this collection are chiefly such as are not common in Italy. The arrangement is as follows; the spaces between the beds being turf, and the main walks gravel; the whole surrounded by a wall, except at the west end.

A. THALAMIFLOˋRÆ.

1. *R*anunculàceæ.
2. *Berberídeæ.*
3. Podophyllàceæ.
4. *P*apaveràceæ.
5. *F*umariàceæ.
6. Crucíferæ.
7. *C*istíneæ.
8. *V*iolarièæ.
9. *C*aryophýlleæ.
10. *L*íneæ.
11. *M*alvàceæ.
12. *H*ypericíneæ.
13. *G*eraniàceæ.
14. Zygophýlleæ.
15. *R*utàceæ.

B. CALYCIFLOˋRÆ.

1. Leguminòsæ.
2. *R*osàceæ.
3. *O*nagràriæ.
4. *L*ythrariàceæ.
5. Melastomàceæ.
6. Passiflòreæ.
7. Crassulàceæ.
8. *S*axifràgeæ.
9. Umbellíferæ.
10. Araliàceæ.
11. *R*ubiàceæ.
12. *Valeriàneæ.*
13. *D*ipsàceæ.
14. Compósitæ.
15. Lobeli*àceæ.*
16. Campanulàceæ.

C. COROLLIFLOˋRÆ.

1. *A*pocýneæ.
2. *A*sclepià*deæ.*
3. *G*enti*àneæ.*
4. Bignoni*àceæ.*
5. *C*onvolvulàceæ.
6. *P*olemoniàceæ.
7. *B*oragíneæ.
8. *S*olàneæ.
9. Scrophulariàceæ.
10. Labiàtæ.
11. *V*erbenàceæ.
12. *A*canthàceæ.
13. Primulàceæ.
14. Globulàriæ.
15. *P*lumbagíneæ.

D. MONOCHLAMY′DEÆ.

1. *P*lantagíneæ.
2. Nyctagíneæ.
3. *P*olygòneæ.
4. *E*uphorbi*àceæ.*
5. *U*rtíceæ.
6. *R*esedàceæ.
7. *P*iperàceæ.

E. ENDO′GENÆ.

1. *O*rchídeæ.
2. *I*rídeæ.
3. Amaryllí*deæ.*
4. *H*emerocallídeæ.
5. *S*milàceæ.
6. *A*sphodèleæ.
7. *Tulipàceæ.*
8. *M*elanthàceæ.
9. *A*röídeæ.
10. *J*únceæ.
11. *C*yper*àceæ.*
12. *G*ramíneæ.

F. ACRO′GENÆ.

1. *F*ílices.
2. *E*quisetàceæ.

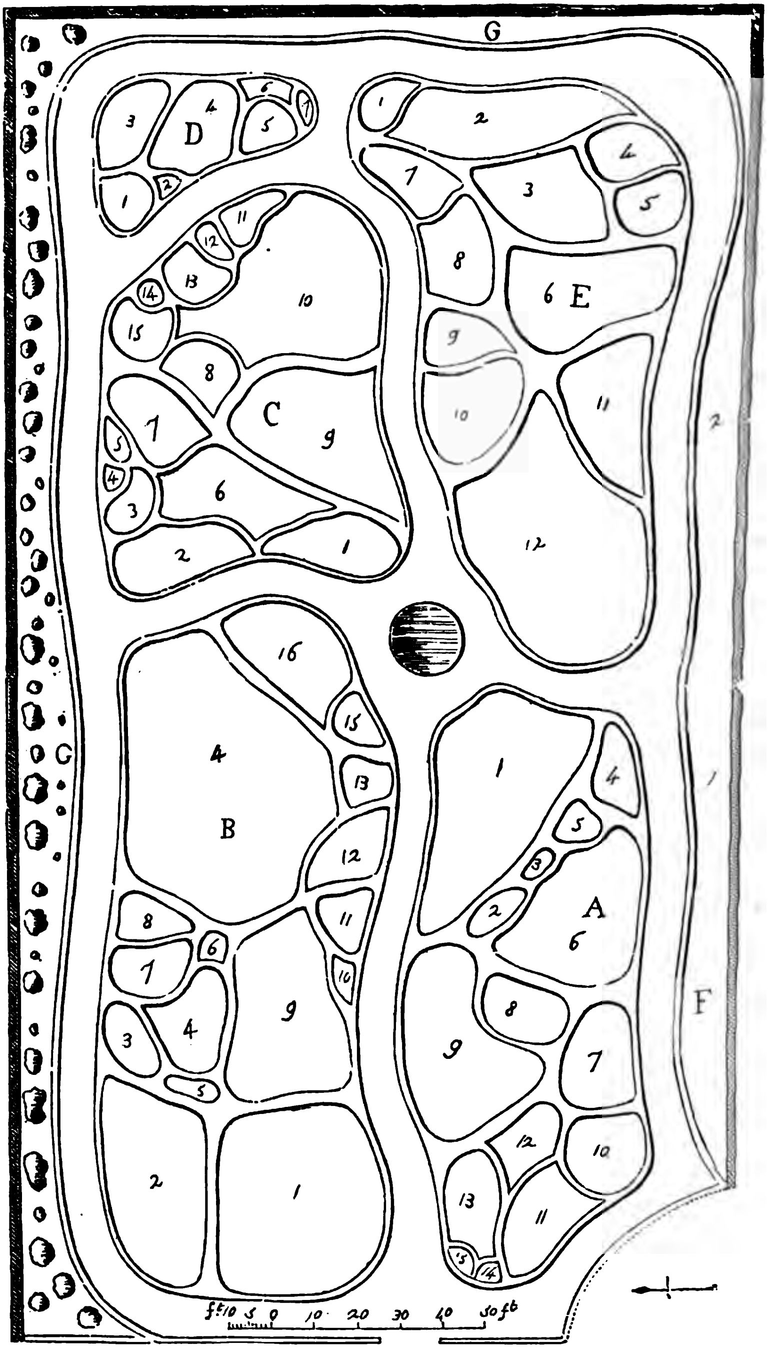

Fig. 111. *Natural Arrangement of Herbaceous Plants in the Vice-Regal Gardens at Monza.*

G. HALF-HARDY PLANTS.

*J*asmìnum heterophy̆llum, Erythrìna *C*rísta-gálli, Poinci*àna* Gillièsii, Pittósporum *Tobìra*, Siphocámpylos bícolor, Raphiólepis *s*alicifòlia, *D*iospy̆ros *Káki*, Cliánthus puníceus, Edwárds*ia* microphy̆lla, E. grandiflòra, *B*upleùrum coriàceum, *B*. fruticòsum, Passiflòra cærùlea, P. cærùlea cærùleo-racemòsa, Escallòn*ia* montevidénsis, E. rùbra, E. floribúnda, Fúchs*ia* venústa, F. fúlgens, F. corymbiflòra, Hovèn*ia* dúlcis, Azàlea índica, Callistèmon lanceolàtus, Illícium floridànum, Grabówski*a* boerhaav*iæfòlia*, *L*aúrus Borbòn*ia*, *Seríssa* fœ′tida, *E*læágnus argéntea, Búddle*a* globòsa, *C*y̆tisus nubígenus, *A*′rbutus *A*ndráchne, *A*. *A*ndráchne serratifòlia, *G*enísta thyrsiflòra, *L*igústrum lùcidum, *L*. nepalénse, *C*eanòthus cærùleus, Benthàm*ia* acuminàta, B. fragífera, *O*′lea fràgrans, *O*. fràgrans longifòlia, Pernétt*ia* mucronàta, Camélli*a* japónica, *C*neòrum bícolor, Duvaú*a* depéndens, Podocárpus macrophy̆llus, &c.

Monza, near Milan, July 10. 1843.

(*To be continued.*)

ART. VII. *Botanical, Floricultural, and Arboricultural Notices of the Kinds of Plants newly introduced into British Gardens and Plantations, or which have been originated in them; together with additional Information respecting Plants (whether old or new) already in Cultivation: the whole intended to serve as a perpetual Supplement to the "Encyclopædia of Plants," the "Hortus Britannicus," the "Hortus Lignosus," and the "Arboretum et Fruticetum Britannicum."*

Curtis's Botanical Magazine; in monthly numbers, each containing seven plates; 3*s*. 6*d*. coloured, 3*s*. plain. Edited by Sir William Jackson Hooker, LL.D., &c., Director of the Royal Botanic Garden, Kew.

Edwards's Botanical Register; in monthly numbers, new series, each containing six plates; 3*s*. 6*d*. coloured, 3*s*. plain. Edited by Dr. Lindley, Professor of Botany in the University College, London.

Paxton's Magazine of Botany, and Register of Flowering Plants; in monthly numbers; large 8vo; 2*s*. 6*d*. each.

Leguminòsæ.

3673. ZI′CHY*A*
villòsa *Lindl.* hairy ⊥ ⊔ or 3 su R Swan River 1841. Bot. reg. 1842, 68.

A very pretty free-growing species of this genus, which succeeds best in a mixture of loam and peat not broken fine, and with the pots well drained. "It is easily increased by cuttings, or by seeds which are produced freely when the plants get large." (*Bot. Reg.*, Dec. 1842.)

1976. AMI′CI*A* 17668 zygómeris *Bot. Mag*. 4008.

2136. *LA*′THYRUS
nervòsus *Lam.* nerved ⊥ ⊔ pr 3 su B South Brasil 1840. D co Bot. mag. 3987.

A greenhouse plant with blue flowers and glaucous leaves. It may be planted out in summer, when it will flower in the open border. (*Bot. Mag.*, Dec. 1842.)

[3996.
pubéscens *Hook et Arn.* downy ⊥ ⊔ pr 3 my P.B South Brasil 1840. D co Bot. mag.

A hardy greenhouse plant, with trailing stems of 2 or 3 feet long, and clusters of purplish blue flowers. The whole plant is covered with a soft silky down. (*Bot. Mag.*, Feb. 1843.)

2837. *A*CA'CIA 24647 biflòra ***Paxt. Mag. Bot.*** **vol. ix. p. 221.**

spectábilis Benth. A beautiful species with glaucous leaves, and erect racemes of deep yellow balls of flowers. Introduced from the Swan River by Messrs. Lucombe, Pince, and Co. of Exeter. (*Bot. Reg.*, May, 1843, Misc.)

2072. INDIGO'FERA **[reg. 1843, 14.**
stachyodes *Lindl.* *long*-spiked ■ ⊔ or 6 s L.C North-east of India 1839. C r m Bot.

The seeds of this plant were collected at Bhotan, in the north-east of India, 4000 feet above the level of the sea. It forms a handsome greenhouse shrub, flowering nearly all the summer, and it is increased by cuttings of the young wood. (*Bot. Reg.*, March, 1843.)

Dósua **Don Dosua ■ ⊔ or 6 s Pk Nepal 1840. C r m Bot. reg. 1842, 57.**

This is a very pretty species of Indigófera, with abundance of deep rose-coloured flowers mingled with the leaves. It appears almost hardy enough to stand in the open border, and there is no doubt that in Devonshire and Cornwall it would be quite hardy and very ornamental. It grows best in a rich soil. (*Bot. Reg.*, Oct. 1842.)

Rosàceæ.

Spiræ'a fissa Lindl. This hardy shrub, which was supposed to be new, flowered in November, 1841, and proves to be the same as the *S*piræ'a argéntea of Mr. Bentham. As, however, there is another *S*piræ'a argéntea, this plant will probably retain its specific name of fissa, which alludes to the appearance of the leaves when young, as they seem to be split up into numerous coarse teeth. (*Bot. Reg.*, Jan. 1842, Misc.)

Sievérsia eláta Royle. A hardy herbaceous plant from Nepal. The flowers are large and handsome, and they are produced in panicles of three or four flowers each. (*Bot. Reg.*, July, 1842, Misc.)

Combretàceæ.

1203. *C*OMBRE'TUM 10200 grandiflòrum ***Paxt. Mag. Bot.*** **vol. ix. p. 169.**

Onagràceæ.

1188. FU'CHS*IA*
alpéstris *Gard.* mountain ⊥ ⊔ or 20 su S Brazil 1841. C l.p Bot. mag. 3999.

This very distinct and elegant species of Fúchs*ia* was found by Mr. Gardner, during his last visit to the Organ Mountains. The flowers are of the same shape as those of F. coccínea, but they are smaller, and the sepals are of a bright rose colour, with dark purple petals. The leaves are very handsome, being entire, with a long point, and densely pubescent ; the margins are slightly revolute ; and, in the old leaves, the margin, midriffs, and large veins are dark red. (*Bot. Mag.*, Feb. 1843).

spléndens *Zucc.* splendid ⊥ or 6 su S.G Mexico 1841. C r.m Bot. reg. 1842, 67.

The flowers of this species bear considerable resemblance to those of F. fúlgens, but they have much shorter tubes ; and the stamens, which project a good way beyond the mouth of the corolla, have large pale yellow anthers. "When very young, the foliage and lengthening branches are quite hoary with down. It is a native of Mexico, where it was found 10,000 feet above the level of the sea ; so that it is probable it will prove the hardiest of its race." (*Bot. Reg.*, Dec. 1842.)

GODE'T*IA* **[61.**
grandiflòra *Lindl.* large-flowered ○ or 2 j.au Pk California 1838. S co Bot. reg. 1842,

This is a very handsome annual, with very large flowers of a peculiarly delicate texture, which bear some resemblance to those of G. ròsea-álba, but are much handsomer. The plant formed a bush of about 2 ft. high, and is well deserving of cultivation ; but, unfortunately, no seeds were saved of it. (*Bot. Reg.*, Nov. 1842.)

Melastomàceæ.

1360. PLERO'MA **[4007.**
Benthami*ànum* Gard. *Mr.* Bentham's ■ □ or 6 au.o P Brazil 1841. C p.l Bot. mag.

This is a very handsome plant, with large purple flowers, which sometimes measure 2 in. across, and are quite white in the centre. It was found by Mr. Gardner on the Organ Mountains, in rather boggy soil, at about 3000 ft. above the level of the sea. (*Bot. Mag.*, April, 1843.)

MEDINI'LLA [bot. vol. ix. p. 79.
erythrophýlla *Blume* red-leaved ꭡ ⊔ or 2 su Pk East Indies 1837. C p.l Paxt. mag.

A handsome greenhouse or stove shrub, with clusters of rose-coloured flowers, with blue anthers. The leaves are reddish when young, though they become afterwards of a pale green. The plant should be grown in a mixture of turf and heath mould, and watered freely during the summer months. (*Paxt. Mag. of Bot.*; May, 1843.)

CENTRADE'NIA *G. Don.* (*Kentron*, spur, *adēn*, gland; spur-like glandular appendages to anthers.)
ròsea *Lindl.* rose-coloured ꭡ ⊔ pr 1 ja W. Mexico 1840. C s p Bot. reg. 1843, 20.

A very pretty little greenhouse shrub, which seldom grows more than a foot high, but has such a number of branches that it appears a perfect mass of flowers. The flowers are small, but they are very pretty; as they are white, tinged with pink. "It is a soft-wooded species, growing a foot high in a sandy peat, and striking readily from cuttings." It is frequently called in the nurseries Doncklaèr*ia* diversifòlia. (*Bot. Reg.*, April, 1843; and *Paxt. Mag. of Bot.*, June, 1843.)

MARCE'T*IA* Dec. (Named in honour of *Dr. Marcet* of Geneva.)
excoriàta *Dec.* loose-barked ꭡ □ pr 1 su W Mexico 1842. C. s.p Bot. reg. 1843, 31.

This pretty little plant belongs to a genus very little known in England, though it is met with occasionally on the Continent. The species are all natives of tropical America, where they are found in the mountainous districts, in sandy places; and where they have almost the habit of heaths. This plant, which is probably the only one of the genus in Great Britain, flowered in the splendid collection of the Duke of Northumberland at Syon. (*Bot. Reg.*, June, 1843.)

Myrtàceæ.

HYPOCALY'MMA *Endl.* (*Hupo*, under, *kalumma*, veil; the bracts hiding the calyx from below.)
robústum *Endl.* robust ꭡ ⊔ or 1 my Pk New Holland 1842. C l.p Bot. reg. 1843, 8.

This very pretty little plant has flowers so much like those of a peach, except in being smaller, that it is often mistaken for a small almond or peach tree in New Holland; particularly as rose-coloured flowers are so very rare among the myrtles. This plant flowered in the greenhouse of Messrs. Lucombe and Pince of Exeter. It requires to have the pots in which it is grown well drained. The leaves, when bruised, smell like lemon. (*Bot. Reg.*, Feb. 1843.)

Passiflòreæ.

1923. **PASSIFLO'RA**
actinia *Hook.* sea-anemone-like ⌊ □ cu 10 f G Brazil 1842. C co Bot. mag. 4009.

This very singular passion-flower is named in consequence of its resemblance to those marine animals, so common on rocky coasts, which are known by the name of the sea-anemone, or actinia. Its flowers are very fragrant. This species is a native of the Organ Mountains of Brazil; and it requires the usual culture of stove plants. (*Bot. Reg.*, April, 1843.)

Loasàceæ.

2193. ***LOA'SA***, **or CAIO'PHORA** [bot. vol. ix. p. 269.
Herbért*ii* Paxt. *the Rev. W.* Herbert's ⊥ ⊔ or 6 su S hyb. 1842. S. s.p Paxt. mag.

This very splendid annual is a hybrid between *L.* lateritia and *L.* pentlándica. It is a very handsome greenhouse climber, and will flower freely in the open air during the summer and autumn. (*Paxt. Mag. of Bot.*, 1843.)

1447. **PORTULA'CA splèndens, garden variety.**

This is a garden variety of Portulàca Thellusònii. "It is a tender annual, growing about a foot high, which flowers most abundantly from July to September, if treated in the following manner. The seed should be sown about the middle of March, in pots filled with a mixture of sandy loam, old lime rubbish, and well decomposed cow-dung, in equal portions. The plants should be raised in a hotbed, and, when large enough, should be potted off singly into small 60-pots, filled with the same kind of compost as that in which the seeds were sown. The young plants, when potted, should be again returned to the hotbed; and, when well established, their pots being well filled with roots, should be re-potted into upright thirty-twos, draining the pots well, and covering the surface of the soil with a thin covering of fine sand. After this, the pots should be placed on the front shelf of a greenhouse, where they are freely exposed to the sun, but guarded from wind and rain, the first of which destroys the flowers, and the latter the plants. Care must also be taken in watering the plants, as on this much depends of the success in their management; for they are very subject to damp off close to the soil." (*Bot. Reg.*, July, 1843.)

Cácteæ.

3359. ECHINOCA'CTUS
centetèrius *Pfeiff.* many-spined st. ⊐ or ½ jl Y.R Mexico 1840. O s.p Bot. mag. 3974.

This is a very handsome species: the flowers are copious and very large, each being nearly 3 in. across. The petals are of a pale yellow, with a reddish streak down the centre. The species is remarkable for the great number of its spines. (*Bot. Mag.*, Oct. 1842.)

1471. MAMMILLA'RIA
pycnacántha *Mart.* densely-spined st. ⊐ or ½ jl Y Mexico 1841. O s.p Bot. mag. 3972.

This plant is remarkable for the large size of its flowers, and their great abundance. The plant itself is about 6 in. high, and the same in width, and the flowers are produced on the summit five or six at a time, each about 3 in. in diameter; so that the flowers take up nearly half the height of the plant. They appear in July, and numerous offsets also are produced from the apex of the plant. (*Bot. Mag.*, Oct. 1842.)

turbinàta *Hook.* top-shaped st. ⊐ gr ½ jl Str Mexico 1838. O s.p Bot. mag. 3984.

This curious plant is only about as large as a moderately sized apple. It is of a singularly pale glaucous hue. The flowers are about an inch in diameter, and seldom more than two or three open at a time. (*Bot. Mag.*, Dec. 1842.)

Cèreus bifórmis Lindl. A pretty plant from Honduras, with bright rose-coloured flowers. (*Bot. Reg.* June, 1843, Misc.)

Cèreus speciosíssimus var. *mínimus*. A very small-flowered variety raised by Mr. Scott, gardener to George Barclay, Esq., of Bury Hill. (*Bot. Reg.*, Sept. 1842.)

Grossulàceæ.

719. *RI'BES*
álbidum *Paxt.* whitish ■ or 4 ap W.Pk hybrid 1842. C co Paxt. mag. bot. vol. x. p. 55.

This very beautiful plant was found in a garden at Inveresk, near Musselburgh. "The flowers are of a very delicate French white, with a pink eye; while the plant has larger racemes of flowers than *R.* sanguíneum, and is a more profuse bloomer. It forms a very pleasing contrast to the deep red flowers of *R.* sanguíneum, and is a most desirable acquisition to the shrubbery and flower-garden. It is propagated in the same way as *R.* sanguíneum (by cuttings or slips), is of the same robust habit of growth, and, like that species, thrives well in almost any sort of soil or situation." (*Paxt. Mag. of Bot.*, April, 1843.)

R*ubiàceæ.*

602. RONDELE'T*IA*
longiflòra *Cham.* long-flowered st. ☐ or 2 au B Brazil 1841. C co Bot. mag. 3977.

This beautiful blue Rondelèt*ia* is another instance of the fallacy of the doctrine of blue and red and yellow flowers not being found in the same genus, as most of the other species of Rondelètia have red and yellow flowers. This plant is highly worthy of cultivation. It flowered, for the first time in England, in the stove in Mr. Veitch's nursery near Exeter. The flowers have an agreeable smell, like those of the Aurícula. (*Bot. Mag.*, and *Paxt. Mag. of Bot.*, Nov. 1842.)

389. MANE'TTIA [vol. x. p. 27.
bícolor *Paxt.* two-coloured £ ⊔ pr 3 f.mr C.Y Brazil 1842. C s.p.l Paxt. mag. bot.

This is a pretty little plant with small lively-looking flowers. A native of the Organ Mountains in Brazil, whence it was introduced by Messrs. Veitch and Son of Exeter. (*Paxt. Mag. of Bot.*, March, 1843.)

*Rhodóstoma gardeni*oìdes *Scheid.* A little inconspicuous bush allied to Gardènia. (*Bot. Reg.*, May, 1843, Misc.)

Habrothámnus fasciculàtus Endl. This very handsome shrub, Dr. Lindley tells us, is in the possession of M. Van Houtte of Ghent. "It forms a bush 5 or 6 ft. high, with broad ovate-oblong leaves, and heads of crimson flowers about the size of those of Burchéllia capénsis, or larger. These heads are arranged in a panicle, so as to render the branches a complete mass of blossom." (*Bot. Reg.*, July, 1843, Misc.)

REVIEWS.

Art. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

Baxter's British Flowering Plants. No. 128., completing the work. 8vo. Oxford and London, 1843.

We again strongly recommend this work, as we have frequently done before; and we congratulate its indefatigable author on its completion. Its value is greatly increased by copious indexes, tables of contents classified, an ample list of books quoted or referred to, a list of the few errata which have occurred, and ample directions to the binder with respect to the plates.

Catalogue of Hardy Trees and Shrubs cultivated and sold by Whitley and Osborn, Fulham, near London. One sheet folio, to go by the penny post. Fulham Nursery, 1843.

This is undoubtedly the most complete catalogue of hardy trees and shrubs that ever was published in this or in any country. A sign, the same as in our *Abridged Arboretum*, indicating the habit of the plant, is placed before each species and variety; and the authority for the name, and the height which the plant attains, or is supposed to attain, in the climate of Britain, after it. Those plants that require sandy or dry peat, bog or moist peat, or sandy loam, are also indicated; but the shortest way to give an idea of this catalogue will be to copy the table of contents: —

"The nomenclature is the same as that of the *Arboretum Britannicum* and the *Encyclopædia of Trees and Shrubs*, except the very few names marked with a *, which we have not been able to identify with these works, or which have been introduced since their publication. Where no authority is given after the name, the *Arboretum Britannicum* and the *Encyclopædia of Shrubs* are to be understood as such. The heights given are approximations to what it is *supposed* the plants will attain in this country, in order to serve as some guide in planting them out. In giving the heights of trailers and creepers, the length of stem has been followed, as in the case of climbers and twiners.

"To facilitate the naming of trees and shrubs sent out from this nursery, Messrs. Whitley and Osborn can supply their customers with lead labels, 5½ in. long by 2¼ in. broad, and ⅛ in. thick, with the scientific name, English name, and native country, stamped with steel types, at 2½*d.* each. These lead plates, having a small hole at each corner, may be bent, applied, and fastened by nails to oak or larch stakes; or they may be fixed with putty, in sunk panels, in such bricks as were used in the Derby Arboretum. [Vol. XVI.]

DECIDUOUS TREES.

Signs.		No.
♣	Round-headed - - -	471
♠	Fastigiate-headed - - -	16
▲	Spiry or Fir-headed, with the lateral branches pendent (larch) - - - -	2
▲	Spiry or Fir-headed, the lateral branches horizontal (deciduous cypress) - -	1
♣	Pendulous-headed - -	24

EVERGREEN TREES.

Signs.		No.
♣	Round-headed - - -	50
♠	Fastigiate-headed - - -	8
▲	Spiry or Fir-headed, with the lateral branches pendent (firs) - - - -	21
▲	Spiry or Fir-headed, with the lateral branches horizontal (pines) - - - -	90
♣	Pendulous-headed - -	2

DECIDUOUS SHRUBS.

Signs.		No.
●	Of the largest size - -	129
●	Middle size - - - -	379
●	Under-Shrubs - - -	20
●	Twining Shrubs - - -	33
●	Climbing Shrubs - - -	47
●	Trailing Shrubs - - -	20
●	Creeping Shrubs - - -	4

EVERGREEN SHRUBS.

Signs.		No.
●	Of the largest size - -	66
●	Middle size - - - -	167
●	Under-Shrubs - - -	103
●	Twining Shrubs - - -	3
●	Climbing Shrubs - - -	19
●	Trailing Shrubs - - -	25
●	Creeping Shrubs - - -	4

ABBREVIATIONS.

p.	peat.
b. p.	bog or moist peat.
s. l.	sandy loam."

Total number of species and varieties, making a deduction for those to which two signs are put, 1608.

Lest it should be thought that there is anything exclusive in printing a catalogue with signs, it may be useful to observe that nurserymen in general, and curators of botanic gardens, having their catalogues printed by Mr. Spottiswoode, and willing to go to the small extra expense, may have signs placed before all the species and varieties, whether ligneous or herbaceous, hardy or house plants, as in our *Hortus Britannicus*, *Abridged Arboretum*, and other works in which signs of habits, and of natural or garden habitats, are used.

Account of the Museum of Economic Geology, and Mining Records Office, established by Government, in the Department of Her Majesty's Commissioners of Woods and Forests, under the Direction of Sir Henry de la Beche, F.R.S. and G.S., Nos. 5. and 6. Craig's Court, Charing Court. Open to the Public gratuitously. By T. Sopwith, F.G.S., &c. &c. 12mo, pp. 120, plates and woodcuts. London, 1843.

"The Museum of Economic Geology, No. 6., Craig's Court, Charing Cross, is open to the public gratuitously every day in the year, Sundays, Good Friday, and Christmas Day alone excepted, from ten o'clock in the forenoon to four in the afternoon in winter (November to February, both inclusive), and until five o'clock during the rest of the year.

"The following account has been drawn up and published, from a conviction that this museum eminently deserves to be extensively known, inasmuch as it is not less important for the objects sought to be attained, than it is interesting and instructive from the varied and popular nature of its contents." (*Preliminary Notice*, p. 8.) This work, like all those by Mr. Sopwith, is very scientifically and carefully got up; the engravings are eminently instructive, and the little book is remarkably cheap.

Sketch of Furness and Cartmel, comprising the Hundred of Londsdale north of the Sands. By Charles M. Jopling. Post 8vo, pp. 275, with two maps, many woodcuts, and vignettes. London and Ulverston, 1843.

A local guide, highly creditable to Ulverston, and giving a very good idea of that part of the country, its antiquities, its geology, its principal country seats, and its history and biography. The description of Conishead Priory, the seat of Colonel Braddyll, about two miles from Ulverston, is illustrated by three engravings, and gives a very graphic idea of that splendid abbatorial residence. The botanical part of the description is drawn up by the head gardener, Mr. Aiton, who also furnished the list, arranged according to the natural system, of plants found indigenous in the neighbourhood of Furness. This list contains a large proportion of comparatively rare species, and it might have been lengthened, we are informed, had there been room. The names generally are correctly spelt, though there are a few defects in this particular in the list of exotics at Conishead Priory, in p. 159. and 160.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Rendle's Tank System of heating by hot Water. — "Our attention has lately been called, by Mr. Beck of Isleworth, to a somewhat novel method of heating by hot water, which appears worthy of being more generally known. The apparatus now in use at that gentleman's residence is upon a very small scale; but the principle upon which it acts is capable of being carried out to any extent, and is at once so simple and economical, that we shall attempt to describe it briefly to our readers.

"The originality of this invention lies with Mr. Rendle of the Plymouth Nursery, who, in June last, forwarded to the Horticultural Society a paper upon the subject, which was read at one of their meetings, and of which an abstract was given at p. 422. of the *Chronicle* of last year. The main point in which it differs from other methods is, that the hot water, instead of circulating round the house in pipes or open gutters, is contained in the centre of the building in a wooden tank, upon the lid of which is a layer of bark or sawdust, raised 3 or 4 feet above the floor, for the reception of pots of cuttings, plants, &c. This tank is divided lengthways by a partition in the centre, with the exception of about 2 in., which are left open at one end to allow the water to circulate; its opposite extremity is connected with a small boiler by means of a pipe. The water, upon becoming heated in the boiler, flows through the pipe into the tank, and, after passing round the latter, returns to the boiler by another pipe: in this manner the circulation of the water is kept up.

"The tank in Mr. Beck's house is about 11 in. deep; but he is satisfied that 6 or 8 inches in depth would be amply sufficient. Its lower part is formed of wood, and the upper of slate, one portion of which is covered with tan for plunging in cuttings, &c.; the remaining part is left bare, so that, on sprinkling it with water, a copious vapour is obtainable. The waste of water in the tank is trifling; when, however, it requires to be replenished, it is easily effected by means of a small orifice left for that purpose in the slate covering.

"The boiler, by which this comparatively large body of water is heated, is of diminutive size, and, perhaps, we cannot give a better idea of it than by supposing one of Rogers's to be divided crossways into two; the lower portion, hermetically closed, will then represent the boiler in question. As in Rogers's, the fire is contained in the centre, and is supplied with fuel from the top. It stands upon a grating raised a few inches from the floor, and is surrounded at the distance of 2 or 3 inches by an iron case, from one side of which the smoke makes its escape through a small chimney. This outer case, or covering, is almost double the height of the boiler; and, the more effectually to prevent the radiation of heat from its sides, an iron cylinder slides down through the opening by which the fire is fed, and fits exactly within the top of the boiler. This answers the double purpose of containing a body of fuel, which settles down and supplies the fire during the night;

and, when the lid is placed upon the outer case, of checking the draught of the fire, which is only continued through some small passages cut in the sides of the cylinder. A small opening also communicates with the fire from the outside, through which the former can be stirred when necessary.

"In a boiler of this kind, many improvements could doubtless be suggested. Mr. Beck is of opinion that a great advantage would be derived by having the boiler, as in Rogers's improved, in the form of a dome above the fire, and by having the latter fed on one side by means of a shelving hopper, covered in, and placed as near as convenient to the top of the apparatus.

"During the time in which this system has been in working, the water has never been within many degrees of the boiling temperature, yet the thermometer within the house has seldom, on the coldest nights, fallen below 60° or 65°. Its great advantages are, that the tank in which the water circulates will, with such modifications as circumstances may require, serve as a stage for plants, either in the centre or round the sides of a house, by which the expense of hot-water pipes will be dispensed with; and its extreme simplicity, which is such that any person situated at a distance from engineers might, with a little ingenuity and the assistance of a carpenter and blacksmith, erect an apparatus of his own; since any boiler which would create a circulation of water would answer as well as the one above described, although it might not be equally economical. We may also state that the atmosphere of the house in which this system is adopted is remarkably pure." (*Gard. Chron.*, Jan. 14. 1843.)

"I read with pleasure your notes at p. 19. of the *Chronicle* respecting a 'new plan of heating,' observed at Mr. Beck's of Isleworth; and also that you do me the justice to ascribe the originality of its invention to me. As you have now brought it prominently before the public, perhaps a few observations from myself may prove acceptable.

"It is a plan which can scarcely be recommended too strongly; for, not only is it adapted for the smallest propagating-house, but also for plant structures of the largest size. You have clearly explained the principle of the apparatus to your readers, therefore description from me would be superfluous. My tank or cistern is about 20 ft. long, and 5 ft. broad; it is situated in the centre of a house, and, except at the end where the boiler is fixed, is surrounded by a walk. The boiler is one of Rogers's, and acts admirably. The depth of the tank is only 6 in., and this is quite sufficient. On the top I have placed large slate slabs, cemented to each other, to prevent a superfluity of steam from escaping into the house.

"When first I thought of this excellent mode, I imagined that, to keep up a sufficient heat in the house, I should be obliged to retain a constant fire; but such is not the case. If the fire is lighted for two hours in the morning and evening, it is quite sufficient to maintain a steady and genial bottom heat; as the large body of water in the reservoir, when once heated, remains warm for a considerable length of time. The thermometer is generally on an average at 65°.

"In a small house this principle can be adopted for less than 5*l.*; and in larger ones, at a cost at least one half less than that of hot-water pipes. As you justly remark, a common blacksmith and carpenter are all that are required to put it up. I doubt not but before many years it will be universally adopted by all those who grow pine-apple, melon, cucumber, or even stove and orchidaceous plants, when we shall find dung, leaves, and other fermenting materials excluded from the pinery and stove, and used only for manures. Even I, who can procure tan and dung at a very low rate, am a saver of at least 20*l.* a year by this discovery; therefore the saving must be very great in a larger establishment, where hundreds of loads of dung, tan, and leaves are consumed annually.

"On the 28th of December last the apparatus was set at work, and my foreman commenced propagating dahlias, which are potted and placed on the top of the slates, and surrounded by sawdust. They are now breaking luxuriantly; hundreds of cuttings are already off, and plunged in sawdust in another part of the tank. I have used the apparatus for more than eight months, and have been highly successful in striking some thousands of plants. It is certainly the most complete plan that possibly can be adopted for a propagating-house." (*W. E. Rendle, Plymouth Nursery;* in *Gard. Chron.*, Jan. 21. 1843.)

The idea of heating by a tank of hot water was put in practice many years ago in St. Petersburg by Count Zubow, and published in the Horticultural Society's *Transactions* in their volume for 1820, p. 430. The water was there heated by steam; but Mr. Rendle's, and also a mode adopted by Mr. Lindsay in the Hammersmith Nursery, are far simpler and more economical. Mr. Lindsay's method (see fig. 67. in p. 267.) is still more economical than Mr. Rendle's. We have also before us plans and a description of a very economical mode which has been adopted at Vienna, and which we hope to publish in due time. Pipes of earthenware are used about Paris, or brick flues cemented inside, as suggested by Mr. Beaton. — *Cond.*

Articles of Cream-coloured Clay. — *Paving Tiles for Walks, and Edgings for Beds in Flower-Gardens,* of a very beautiful cream-coloured and durable material, have been sent us by Messrs. Wyatt and Parker. How far the price may answer we cannot say, but in every other respect the improvement seems great indeed. We may say the same of a very beautiful name plate of this material, intended as a substitute for such plates as have been used in naming the trees in Kensington Gardens. The letters are black, filled into hollows indented by type, and afterwards burnt in; and must, of course, last as long as the material. Of course these name plates can be made of any size, and they are intended to be fitted into a cast-iron frame with a wrought-iron shank, with a disk on it either of cast or wrought iron. Whatever may be the cost of these earthenware labels at first, they are certain to be much cheaper in the long run than painted iron labels, which will require to be renewed every four or five years.

An Edging of Seyssel Asphalte, in lengths of about 3 ft., in thickness about 2½ in., and in depth about 6 in., has been forwarded to us. It has the great advantage of bending when slightly heated, so as to form curved lines of any description; but its dark grey colour we are afraid will be somewhat against it, at least for a year or two after it is put down.

Palmer's Universal Steamer has been recommended to us by a head gardener as the very best cooking utensil he knows for a journeyman gardener's cooking-room. We have tried one, and found it a great improvement on the common tin steamer, and the price is very moderate. Any London ironmonger can supply it.

Palmer's Improved Economical American Oven is recommended by the same gardener, for those bothies where the men can afford to have roast meat. We should say that it will prove as valuable a utensil for the family of the head gardener, as the steamer will for his men. We have had a leg of mutton roasted in one, and also a loaf of bread baked, and found both excellent. The editor of the *British Farmer's Magazine*, speaking of the common American oven says: "It is one of the most valuable inventions of the kind we know, and ought to be in every farm-house and every cottage in the kingdom. Our own family bread is chiefly baked in one of these ovens placed before the fire, and better bread there cannot be from any oven whatever. For roasting (not baking) small joints, we know nothing equal to it." (*B. F. M.*, as quoted in *Supp. Cott. Arch.*, p. 1290.) "One fault alone remained to the American oven, the inability of basting the meat, and the consequent unavoidable waste of dripping, which, owing to the extraordinary reflective power of the American oven, was so burnt and dried up as to render what little remained quite useless. To remedy this evil, the Palmer's improved economical American oven is so constructed as to carry off all the dripping and nutritious quality of the meat, hitherto wasted, into a dripping-pan, placed in such a position that the meat can be thence basted with the dripping without removing the oven from the fire, or interfering in any way with the progress of the cooking." — *Cond.*

ART. II. *Retrospective Criticism.*

THE Study of Bees, and of Chemistry and Vegetable Physiology. (p. 576.) — I would be sorry if Mr. Wighton should think I undervalued the study of bees. I certainly did not mean to express myself in that way. He seemed, however, from his manner of expression, by boasting of an ignorance of alkalies, to undervalue the study of chemistry. I certainly was not of opinion that his pretended ignorance was real, but thought it proper to defend the necessity of the knowledge of chemistry, to a certain extent, to gardeners. There may be differences of opinion as to the comparative space that chemistry ought to occupy in the education of a gardener; but, certainly, it was not rating it too high, to wish a tithe of the time bestowed by Mr. W. on bees to be devoted to that purpose. His work lately published on bees bears evidence of its having originated in a vast deal of attention to the subject. In many situations, however, it may be found that a knowledge of chemistry is of more consequence, in others it may not; education should be as much as possible suited to the future prospects in life; and much more attention may be required, in particular instances, to certain branches than to others. Gardeners, however, as at present situated, are subject to so many changes of place, that a very extensive course is required. When employers come to be better convinced of the benefits resulting, both to man and master, from a servant considering his situation as fixed, and thus being enabled to bring out the capabilities of the grounds intrusted to his charge (which a lifetime is generally short enough to accomplish), it may be more in the gardener's power to know to what branches of education he should most devote his attention. I do not recollect exactly what I said in the *Gazette* about excretions from roots. I am of opinion, however, that it is most likely the excretions from roots give rise to the fungi found there; the fungi found there are more likely, as fungi in general, to feed on morbid excreted matter, than on the sound living tissue of the root: the subject, however, is open to discussion. As to the other parts of the essay, it is needless to make repetitions. I take the meaning of the word virgin soil to be, *untouched;* when pasture has lain long untouched, the soil may get consolidated so far as to regain the property inherent in virgin soil of keeping porous when made so, which no long-worked soil will do. This property, however, is quite independent of any substance contained in the soil; its good effects are more perceptible in light fertile loamy soils than in clayey, but it exists in all new soils; and, like a layer of charcoal spread on the surface, keeps up the proper communication between the soil and atmosphere, which is indispensable to fertility. It is a physical property belonging to its natural constitution, which gives effect to the mechanical operations of pulverising, which are soon obliterated in effete worn-out soils, by their tendency to dissolve into powder. This is quite independent of any organic matter accumulated in the pasture, or saline substances washed into the subsoil; it is a natural principle in the constitution of the soil denoting vigour, while long working is productive of an exhaustion which no manures we can apply will altogether remove. The arguments I brought forward on this head in the former essay are what I have considered as solving the question in my own mind, perhaps better than I have been able to explain myself; but I am open to conviction, and may be mistaken, and there is nothing like proper discussion for eliciting the truth. The benefits pointed out by Mr. W. are great, but more in the power of manures to remedy; the other, nothing but time to consolidate, or trenching, will amend. I hope, however, that both essays will have been found beneficial as expressions of opinion, on which the readers of the Magazine will form a judgement for themselves. — *R. Lymburn. Kilmarnock, November,* 1842.

THE
GARDENER'S MAGAZINE,
OCTOBER, 1843.

ORIGINAL COMMUNICATIONS.

Art. I. *Comparative Physiology.* By R. Lymburn.

(*Continued from* p. 470.)

The roots of plants are peculiarly fitted for ramifying in the soil; they are not elongated by expansion like stems, but increase by additions from within to the point, and, not being confined in their developement by joints, ramify wherever they meet with obstructions, or food is found in abundance. They can enter the smallest crevices, and by the additions from within force their way onwards; and, when food is at a distance, the rapidity with which they elongate in quest of it is astonishing. When they meet with porous substances containing absorbed food, they ramify round them in all directions; and, in rotted leaves or well rotted manure, the fibres are always more abundant than in poor soil. The stomach of plants can only be represented by the soil. As the food of plants requires more decomposition than that of animals, a greater chemical power is found in the soil; and, as plants organise their tissues from nascent elementary substances, much decomposition is required, and the heat of the soil and admission of air cannot be too much attended to. Pitchers and other appendages may assist the general absorbing power, which is found on the whole surface of the plant, especially on the under side of the leaves; and, in particular circumstances, this general power may take the place of the special absorbing apparatus of root, and may shadow out the possibility of digestive cavities becoming suitable for plants as well as animals. In as far however as practice is concerned, and for plants under general cultivation, the soil alone can be considered as the stomach; and the necessity of keeping this in proper order becomes at once apparent, and cannot be too much attended to. To keep up a proper degree of heat and moisture in the soil, a certain degree of porosity is required; and when the soil is dug deep in dry weather and broken small, and when the texture of the soil is such as to preserve that condition for a length of time, the powers of the stomach are such that a much greater effect will be produced, than in adverse circumstances where many times the quantity of food has been deposited. The same quarter of the garden or nursery grounds, especially if the soil is a strong loam inclining to clay, if cropped in separate portions and at different times, will have one part, which was worked dry and got a few dry days after working, producing an excellent crop, while another portion equally well worked and manured, which has unfortunately been subject to saturating rains before the particles of soil were dried sufficiently, will be found much worse. If small seedling crops have been sown there is frequently a total failure; and with stronger crops the growth is weak and yellow, compared with that where, the soil being worked dry and keeping open, the proper action of the stomach is preserved. It is in this way that turf buried, or deposit of roots left from previous crops, acts; or trenching of the soil and bringing up a new surface, which from long lying has recovered its powers of constitution, and is not so apt to run off into powder and close up the pores, as old effete long-worked soil does; it is from these deposits and the renewed constitution of the soil preserving an open porous state, that such astonishing effects are at times produced. I have often seen the crops twice as large from these circumstances alone, and the trees as large in one piece of the same quarter at one year's growth as in another piece at two years' growth, when there was no difference of the manure and other preparations. If the soil is too loose and sandy, or from long working falls into powder too easily, or if it is a strong clay not admitting of breaking freely into pieces, no manure will remedy these defects, unless deposited in such quantities as to alter the texture of the soil; and it is the same with good land, which has unfortunately been battered with heavy rains immediately after pulverisation, especially on clayey loams, which in good seasons and under proper circumstances often produce the best crops. Farm-yard manure acts much in the way of keeping the soil open and absorbing moisture, and this is one of the reasons why it will be found generally superior to concentrated manures, unless where carriage is expensive; by its gradual decay it keeps the soil porous: and concentrated manures will always be found of most value, especially those like guano containing much nitrogen, when mixed up with bulky substances, as sawdust of deciduous wood, peat-moss, scourings of ditches, or refuse of gardens, weeds, &c.

The changes on the substances absorbed by the spongioles of plants are probably confined to the rejection of insoluble substances, changes in the substances taken up being more proper to secretion or assimilation. The absorbents, or especially the absorbing glands, of animals have been thought to produce some changes on the chyle, but this seems uncertain; and these vessels appear to be endowed with more sensibility than those of plants. The power of endosmose seems similar to that described as hygroscopicity by DeCandolle, but more intimately and fully examined by Dutrochet. It is stated by DeCandolle, Muller, and others, that the connexion of endosmose with electricity, which Dutrochet fancied he had made out, has not been confirmed; it is probable, however, from the connexion of electricity generally with all action, that it will be concerned either as cause or effect. Some have attributed the power to a compound and greater attraction subsisting in a dense fluid from its more compound nature, than in a fluid comparatively more simple; others say that the tissue of the bladder has more attraction for some substances than others, and causes those substances to be longer in passing through the pores. Dr. Carpenter seems to be something of this opinion. Saussure, who made many experiments on this subject, was of opinion that they passed more or less quickly according to their liquidity, which would mechanically allow of their passing the pores more easily. Professor Thomson* objects to this, that more water would require to be absorbed; the quantity of water absorbed by plants under proper circumstances ss, however, so great as to modify this objection; the thinner the fluid it should certainly pass thc more easily, and, if we suppose the operations of nature to be conducted on the most perfect plan, the membrane set apart for absorption should not have that faculty interfered with by another chemical power possessed by the same organ. Vogel† found in his experiments that most plants, if supplied at the roots with an unlimited quantity of saline substances in solution, would absorb so much, even of those found beneficial in smaller quantities, such as nitrate of potash, &c., as to cause death. The sulphate of copper he found, like Saussure, most rapidly absorbed; and this and others partially decomposed, by the abstraction of oxygen reducing the salt to the state of a protosulphate; other saline substances were found unaltered after death. He found that chara and some other plants would not absorb the salts of copper; this he attributes to their containing much carbonate of lime, but it is probably owing to the peculiar formation of the invisible pores, which all absorbing membranes are supposed to possess. Capillary attraction is thought to assist in absorption by furthering the ascent or removal of the imbibed fluid, so as to allow the denser descending sap to renew the phenomena of endosmose. Some think the fact, that imbibition is sometimes found to have the strongest current from the denser to the lighter fluid, a proof that some other power than endosmose is concerned in imbibition; others say it is the same phenomenon modified by some peculiarities of the fluids themselves, or of the vessels they circulate in. In animals at least, absorption, if produced by endosmose, must, it is said, be held in check by vitality preventing the mingling of fluids, and causing it to act in some cases and cease in others.

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* Thomson's Organic Chemistry of Vegetables, p. 974.

† Gardeners' Chronicle, May 23. 1843.

The fact of the existence of an exosmose as well as endosmose current seems to infer the truth of the theory of the excretions by the roots of plants, now generally admitted by most physiologists and chemists, though still doubted by some very eminent men. The experiment of Dr. Madden, in which, having washed the roots of a plant of groundsel, and introduced one half of them into a phial containing water mixed with ulmate of ammonia, and the other half into a phial of pure water, he found at the end of a few days an excretion of a gummy-looking substance in the pure water, seems to confirm and corroborate those of Macaire. The fungi found so abundantly on the roots of some plants, as those of Scotch fir, spruce, oak, &c., must be fed by morbid excreted matter from the roots, probably of a nitrogenous nature, as nitrogen forms so large a proportion of these plants.

Besides capillary attraction and vital contractility, which assist the power of endosmose by furnishing the conditions needed, of removing the thinner imbibed fluid and supplying its place with denser sap, it is thought by many, from the peculiar force with which imbibitions take place in the living spongiole, as compared with the phenomena of endosmose in dead membranes, that a peculiar vital force is also concerned, which may very likely be the case. Besides the absorption by the roots, water and its contents are absorbed by other parts of plants, especially by the under side of the leaf.

(To be continued.)

Art. II. *The Principles of Landscape-Gardening and of Landscape-Architecture applied to the Laying out of Public Cemeteries and the Improvement of Churchyards; including Observations on the Working and General Management of Cemeteries and Burial-Grounds.* By the Conductor.

(*Continued from* p. 494.)

IX. LISTS OF TREES, SHRUBS, AND PERENNIAL HERBACEOUS PLANTS, ADAPTED FOR CEMETERIES AND CHURCHYARDS.

In the following selections we have chiefly included plants that are quite hardy, and that, when once properly planted and established, will grow in turf or other firm soil without having the surface annually dug, or kept clear of weeds or grass. We have avoided most of the species of such genera as *C*ýtisus, *G*enísta, *C*olùtea, *Ríbes*, *R*òsa, &c., which not only require dug soil, but are short-lived, or are very apt to die off. To those who do not require such lists for cemeteries or churchyards, they will be useful as indicating the principal permanent trees and shrubs adapted for pleasure-grounds, which are sold in British nurseries. The number might have been increased, but we have judged it best to be comparatively select.

Our classification of the trees and shrubs is founded on their different degrees of suitableness for burial-grounds; and we have given references to our *Arboretum Britannicum*, where portraits of the entire tree, and copious details, botanical, descriptive, historical, geographical, &c., will be found; and to the *Encyclopædia of Trees and Shrubs*, which is an abridgement of that work, in which engravings will be found of every species, and such details as are necessary as guides to their culture, management, and uses in plantations. We have added after each species the height which it generally attains in the climate of London, and the price of good plants in the London nurseries when one plant only is ordered; when several are wanted, of course the price will be lower, according to the number. We can vouch for their being obtained correct to the names, and at the prices mentioned, at the Fulham Nursery.

EVERGREEN TREES.

Evergreen Trees with Needle Leaves, and the Branches fastigiate and vertical.

*C*uprèssus sempervìrens *Encyc. of Trees and Shrubs* p. 1073. *Arb. Brit.* p. 2464., the Italian Cypress. Height 30—40 ft. 1*s*. 6*d*. The best of all trees for a cemetery, but not suited for exposed situations.

*T*àxus baccàta fastigiàta *E. of T.* p. 939. *A. B.* p. 2066., the Irish Yew. Height 20—30 ft. 2*s*. 6*d*. The second best cemetery tree, and quite hardy.

*T*àxus baccàta eréeta *E. of T.* p. 940. *A. B.* p. 2066., the upright Yew. 2*s*. 6*d*. Third best.

*J*unìperus commùnis suécica *E. of T.* p. 1081. *A. B.* p. 2489., the Swedish Juniper. Height 10—12 ft. 1*s*. 6*d*. Equally good with the Irish yew, except that it is of a lighter colour.

*J*unìperus commùnis hibérnica *E. of T.* p. 1082., the Irish Juniper. Height 6—8 ft. 1*s*. 6*d*. Equal to the Swedish juniper.

*J*unìperus excélsa *E. of T.* p. 1088. *A. B.* p. 2503., the tall Juniper. Height 20—30 ft. 10*s*. 6*d*. This promises to be an excellent cemetery tree, in climates suitable for the *C*uprèssus sempervìrens.

Evergreen Trees with Needle Leaves, of narrow conical Forms, the Branches horizontal.

*C*uprèssus sempervìrens horizontàlis *E. of T.* p. 1073. *A. B.* p. 2465., the spreading Cypress. Height 30—40 ft. 1*s*. 6*d*.

*J*unìperus virginiàna *E. of T.* p. 1084. *A. B.* p. 2495., the red Cedar. Height 30—40 ft. 1*s*. 6*d*. Suitable, and very hardy.

*J*unìperus phœnícea *E. of T.* p. 1087, *A. B.* p. 2501., the Phœnician Juniper. Height 10—20 ft. 2*s*. 6*d*.

*J*unìperus chinénsis *E. of T.* p. 1089. *A. B.* p. 2505., the Chinese Juniper. Height 15—20 ft. 2*s*. 6*d*.

*T*hùja occidentàlis *E. of T.* p. 1068. *A. B.* p. 2454., the American Arbor Vitæ. Height 40—50 ft. 1*s*. 6*d*.

Thùja orientàlis *E. of T.* p. 1070. *A. B.* p. 2459., the Chinese Arbor Vitæ. Height 18—20 ft. 2*s.* 6*d.* More suitable, and also hardier, than the preceding species.

Evergreen Trees with Needle Leaves, conical in Shape, the Branches horizontal, but somewhat taller than those before enumerated.

A'bies álba *E. of T.* p. 1030. *A. B.* p. 2310., the white Spruce Fir. Height 40—50 ft. 2*s.* 6*d.*

A'bies nìgra *E. of T.* p. 1031. *A. B.* p. 2311., the black Spruce Fir. Height 60—70 ft. 2*s.* 6*d.*

Pícea balsàmea *E. of T.* p. 1044. *A. B.* p. 2339., the Balm of Gilead, or American Silver Fir. Height 20—30 ft. 1*s.* 6*d.*

Pícea pectinàta strícta (*Rivers*) *Gard. Mag.* 1843, p. 61., the upright Silver Fir. 5*s.*

Evergreen Trees with Needle Leaves, less conical in Shape, but peculiarly suitable for Churchyards and Cemeteries.

Táxus baccàta *E. of T.* p. 939. *A. B.* p. 2066., the common Yew. Height 20—30 ft. 1*s.* 6*d.* A very suitable cemetery tree where a spreading head is not an objection.

Táxus baccàta argéntea, the Silver Yew. 2*s.* 6*d.*

Táxus baccàta aúrea, the Golden Yew. 3*s.* 6*d.*

A'bies canadénsis *E. of T.* p. 1035. *A. B.* p. 2322., the Hemlock Spruce Fir. Height 30—60 ft. 2*s.* 6*d.*

Evergreen Trees with Needle Leaves, of conical Shape, the Branches horizontal, but of larger Growth than the preceding Kinds.

A'bies excélsa *E. of T.* p. 1026. *A. B.* p. 2293., the common Spruce. Height 60—80 ft. 6*d.* The cemetery tree of Sweden and Norway. The twigs are strewed over the corpse before the coffin lid is closed, and also over the floor of the room containing the corpse, and on the grave after the interment has been completed. The tree admits of being cut or clipped into any form. It is the principal tree in the large mountain cemetery at Rouen. (See *Gard. Mag.* for 1841, p. 291.)

A'bies Smith*iàna* E. of T. p. 1032. A. B. p. 2317., the Khutrow Spruce Fir. Height 50 ft. 5*s.*

A'bies Douglàs*ii* E. of T. p. 1033. A. B. p. 2319., Douglas's Spruce Fir. Height 100—180 ft. 10*s.* 6*d.*

A'bies Menzièsii E. of T. p. 1034. A. B. p. 2321., Menzies's Spruce Fir. 5*s.*

Pícea pectinàta *E. of T.* p. 1037. *A. B.* p. 2329., the Comb-like-leaved Silver Fir. Height 80—100 ft. 1*s.*

Pícea cephalónica *E. of T.* p. 1039. *A. B.* p. 2325., the Mount Enos Fir. Height 50—60 ft. 2*s.* 6*d.*

Pícea *Pinsàpo* E. of T. p. 1041., the Pinsapo, or Malaga Silver Fir. Height 60—70 ft. 5*s.*

Pìnus *Cémbra* E. of T. p. 1016. A. B. p. 2274., the Cembran Pine. Height 50—80 ft. 2*s.* 6*d.* A slow-growing, narrow, conical tree; very hardy; and not unsuitable for small burying-grounds, when the Irish yew or Swedish juniper cannot be got.

Evergreen Trees with Needle Leaves, of conical Shapes, the Branches horizontal, but attaining a large Size, which nevertheless admit of being cut in so as to form narrow conical Trees suitable for large Cemeteries.

Pìnus sylvéstris *E. of T.* p. 951. *A. B.* p. 2153., the Scotch Pine, or Scotch Fir. Height 60—100 ft. 6*d.* The tree of death and mourning in Russia is the pine, which may be called the Northern Cypress. The poor strew the coffin, at the time of exhibiting the corpse, with pine twigs; and, at the funerals of the wealthy, the whole way from the house to the churchyard is thickly strewed with branches of the same tree. Hence those streets of Petersburg through which funerals frequently pass are almost always covered with this sign of mourning. (*Kohl's Russia*, vol. i. p. 214.) The badge of the Highland clan M'Gregor.

Pìnus Larício *E. of T.* p. 956. *A. B.* p. 2200., the Corsican, or Larch, Pine. Height 60—150 ft. 1*s.* 6*d.*

Pìnus austrìaca *E. of T.* p. 958. *A. B.* p. 2205., the Austrian, or Black, Pine. Height 60—80 ft. 6*d.* Dark foliage, very hardy, and bears cutting in.

Pìnus taúrica *E. of T.* p. 959. *A. B.* p. 2206., the Tartarian Pine. Height 60—70 ft. 2*s.* 6*d.* A dark-foliaged tree, very hardy, and admitting of being clipped or cut into narrow conical forms. Altogether the noblest of the European pines.

Pìnus Stròbus *E. of T.* p. 1018. *A. B.* p. 2280., the Weymouth Pine. Height 50—80 ft. 9*d.*

Cèdrus Libàni *E. of T.* p. 1057. *A. B.* p. 2402., the Cedar of Lebanon. Height 50—80 ft. 5*s.*

Cèdrus Deodàra E. of T. p. 1059. A. B. p. 2428., the Deodar, or Indian, Cedar. Height 50—100 ft. 7*s.* 6*d.*

* Of the same Kind, attaining a less Size.

Pìnus Pínea *E. of T.* p. 965. *A. B.* p. 2224., the Stone Pine. Height 15—20 ft. 2*s.* 6*d.* More frequently seen as a bush than as a tree, but very ornamental, and its associations are classical.

Pìnus ìnops *E. of T.* p. 970. *A. B.* p. 2192., the Jersey, or poor, Pine. Height 40—50 ft. 2*s.* 6*d.*

Pìnus mitis *E. of T.* p. 974. *A. B.* p. 2195., the soft-leaved, or yellow, Pine. Height 50—60 ft. 2*s.* 6*d.*

Pìnus pumílio *E. of T.* p. 955. *A. B.* p. 2186., the dwarf, or Mountain, Pine. Height 10—20 ft. 2*s.* 6*d.* The foliage dark, and the tree very hardy, and suitable for a burial-ground of limited extent.

Evergreen Tree with Chaff-like Leaves, of a singular Appearance, and well adapted for Churchyards and Cemeteries.

Araucària imbricàta *E. of T.* p. 1062. *A. B.* p. 2432., the Chili Pine. Height 50—100 ft. 5*s.* A very singular tree, of slow growth, and, as it is certain of attracting general attention, when planted in a cemetery, it ought to be surrounded with a wire fence for five or six years to protect it from accidental injury.

Evergreen Trees with Needle Leaves and pendent Branches, peculiarly well adapted for being used in Cemeteries so as to droop over Monuments.

Juníperus recúrva *E. of T.* p. 1089. *A. B.* p. 2504., the recurved Nepal Juniper. Height 5—10 ft. 2*s.* 6*d.* A weeping tree, and on that account peculiarly suitable for cemeteries. Very hardy.

Juníperus virginiàna péndula (*Rivers*) *Gard. Mag.* for 1843, p. 61., the pendulous red Cedar. Hitherto rare. 10*s.*

*J*uníperus commùnis péndula (*Rivers*) *Gard. Mag.* for 1843, p. 60., the pendulous common Juniper. Rare. 5*s.*

*Th*ùja péndula *E. of T.* p. 1071. *A. B.* p. 2461., the drooping Arbor Vitæ. 21*s.* Said to be a hybrid between the red cedar and the Occidental arbor vitæ, raised by accident in Messrs. Loddiges's nursery. There is a fine specimen in the gardens at Kew. Rare, but quite hardy.

The foregoing kinds may all be considered as cemetery trees, *par excellence.* Those which follow are for the sake of variety in cemetery gardens of considerable extent, say fifty acres, and for cemetery arboretums.

Evergreen Trees with broad Leaves, of small Size and narrow conical Forms, which may be used in Cemeteries.

*C*érasus Laurocérasus strícta (*Rivers*) *Gard. Mag.* 1843, p. 57., the upright-growing common Laurel. 2*s.* 6*d.*

Quércus *I*'lex Fórdii, Ford's Evergreen Oak. 3*s.* 6*d.* A very handsome low tree or shrub, and one of the best broad-leaved evergreens for a cemetery.

* Of less fastigiate Forms, and small Size.

*B*úxus baleárica *E. of T.* p. 704. *A. B.* p. 1341., the Minorca Box. Height 15—20 ft. 1*s.* 6*d.*

*B*úxus sempervìrens arboréscens *E. of T.* p. 703. *A. B.* p. 1333., the Tree Box. Height 15—30 ft. 9*d.* The badge of the Highland clan Macintosh.

*B*úxus sempervìrens variegàta. 6*d.* The badge of the clan Macpherson.

** Of the same Kind, less fastigiate, and of larger Size.

I'lex *A*quifòlium *E. of T.* p. 157. *A. B.* p. 505., the common Holly. Height 20—30 ft. 6*d.* Decidedly the best broad-leaved evergreen tree for a cemetery.

I'lex baleárica *E. of T.* p. 160. *A. B.* p. 516., the Minorca Holly. Height 10—20 ft. 2*s.* 6*d.*

I'lex opàca *E. of T.* p. 160. *A. B.* p. 516., the opaque-leaved, or American, Holly. Height 10—20 ft. 3*s.* 6*d.*

*C*érasus Laurocérasus *E. of T.* p. 295. *A. B.* p. 716., the common Laurel. Height 6—20 ft. 6*d.*

*C*érasus lusitánica *E. of T.* p. 294. *A. B.* p. 714., the Portugal Laurel. Height 10—20 ft. 1*s.* 6*d.*

Quércus *I*'lex *E. of T.* p. 880. *A. B.* p. 1899., the common Evergreen Oak. Height 15—30 ft. Several varieties. From 2*s.* to 5*s.* each.

Quércus *S*ùber *E. of T.* p. 884. *A. B.* p. 1800. and 1911., the Cork Tree. Height 20—30 ft. 2*s.* 6*d.*

Quércus Túrneri *E. of T.* p. 885. *A. B.* p. 1922., Turner's Oak. Height 40—50 ft. 2*s.* 6*d.*

Evergreen Trees with broad Leaves and Shoots more or less pendulous, adapted for being planted singly to hang over Graves.

*C*érasus Laurocérasus cólchica (*Rivers*) *Gard. Mag.* 1843, p. 57., the pendulous-branched common Laurel. 5*s.*

I'lex *A*quifòlium péndulum *E. of T.* p. 1113., the drooping-branched common Holly. Rare; not yet to be purchased in the nurseries; but capable of being easily and extensively propagated by budding on the common holly. The badge of the clan Drummond.

Quércus *C*érris fulhaménsis péndula (*Rivers*) *Gard. Mag.* 1843, p. 59., the weeping Fulham Oak.

Quércus *I*'lex péndula, the drooping-branched Evergreen Oak.

DECIDUOUS TREES.

Deciduous Needle-leaved Trees of fastigiate Shapes, which may be used in Churchyards.

Làrix americàna *E. of T.* p. 1056. *A. B.* p. 2399., the American Larch. Height 80—100 ft. 1*s*.

Làrix europæ'a commùnis *E. of T.* p. 1054. *A. B.* p. 2350., the common Larch. Height 80—100 ft. 6*d*.

Taxòdium dístichum *E. of T.* p. 1078. *A. B.* p. 2481., the deciduous Cypress. Height 50—80 ft. 2*s*. 6*d*.

* With pendulous Branches.

Làrix europæ'a péndula *E. of T.* p. 1054. *A. B.* p. 2350., the weeping Larch. 7*s*. 6*d*.

Taxòdium dístichum péndulum *E. of T.* p. 1078. *A. B.* p. 2481., the weeping deciduous Cypress. 5*s*.

Deciduous broad-leaved Trees of fastigiate Forms and small Size.

Amelánchier flórida *E. of T.* p. 414. *A. B.* p. 876., the flowery Amelanchier. Height 10—20 ft. 2*s*. 6*d*.

Amelánchier sanguínea *E. of T.* p. 413. *A. B.* p. 875., the blood-coloured Amelanchier. Height 10—20 ft. 2*s*. 6*d*.

Cotoneáster acuminàta *E. of T.* p. 409. *A. B.* p. 872., the acuminated-leaved Cotoneaster. Height 10—15 ft. 1*s*. 6*d*.

Cratæ'gus Oxyacántha stricta *E. of T.* p. 375. *A. B.* p. 832., the upright Hawthorn. 2*s*. 6*d*. Very hardy, and very suitable for a cemetery where deciduous trees are admitted.

Cratæ'gus tanacetifòlia *E. of T.* p. 372. *A. B.* p. 828., the Tansy-leaved Thorn. Height 20—30 ft. 2*s*. 6*d*.

Gymnócladus canadénsis *E. of T.* p. 255. *A. B.* p. 656., the Kentucky Coffee Tree. Height 30—60 ft. 2*s*. 6*d*.

* Of larger Size.

Pópulus balsamífera *E. of T.* p. 830. *A. B.* p. 1673., the Balsam-bearing Poplar. Height 40—50 ft. 1*s*.

Pópulus fastigiàta *E. of T.* p. 827. *A. B.* 1660., the Lombardy Poplar. Height 50—150 ft. 3*d*.

Quércus pedunculàta fastigiàta *E. of T.* p. 849. *A. B.* p. 1731., the pyramidal Oak. 3*s*. 6*d*. Very suitable from its decidedly fastigiate mode of growth, and narrow conical shape. The common oak, of which this is a variety, is the badge of the clan Cameron.

U'lmus montàna fastigiàta *E. of T.* p. 721. *A. B.* p. 1398., the fastigiate Elm. 1*s*. 6*d*.

Deciduous low Trees with round compact Heads.

A'cer O'palus *E. of T.* p. 89. *A. B.* p. 421., the Opal, or Italian, Maple. Height 8—12 ft. 1*s*. 6*d*.

A'cer monspessulànum *E. of T.* p. 92. *A. B.* p. 427., the Montpelier Maple. Height 15—40 ft. 1*s*. 6*d*.

A'cer créticum *E. of T.* p. 94. *A. B.* p. 430., the Cretan Maple. Height 10—30 ft. 2*s*. 6*d*.

Cérasus *Mahàleb* E. of T. p. 288. A. B. p. 707., the perfumed Cherry Tree. Height 10—20 ft. 2*s*. 6*d*.

Liquidámbar imbérbe *E. of T.* p. 933. *A. B.* p. 2053., the beardless Liquidambar. Height 10—20 ft.

O'rnus europæ'a *E. of T.* p. 651. *A. B.* p. 1241., the European flowering Ash. Height 20—30 ft. 2*s.* 6*d.*

O'strya vulgàris *E. of T.* p. 920. *A. B.* p. 2015., the Hop Hornbeam. Height 30—40 ft. 1*s.*

Pỳrus A'ria *E. of T.* p. 432. *A. B.* p. 910., the White Beam Tree. 1*s.* 6*d.*

Pỳrus aucupària *E. of T.* p. 439. *A. B.* p. 916., the Mountain Ash. Height 20—30 ft. 6*d.* The badge of the clan M'Lachlan.

Deciduous Trees of small Size, with Heads more or less irregular, most of which are remarkable for the Beauty of their Flowers or Fruit.

A'cer campéstre *E. of T.* p. 93. *A. B.* p. 428., the Field Maple. Height 15—30 ft. 1*s.*

A'cer spicàtum *E. of T.* p. 80. *A. B.* p. 406., the spike-flowered Maple. Height 18—20 ft. 1*s.* 6*d.*

A'cer striàtum *E. of T.* p. 81. *A. B.* p. 407., the striped-barked Maple. Height 10—20 ft. 1*s.* 6*d.*

A'cer tatáricum *E. of T.* p. 80. *A. B.* p. 406., the Tartarian Maple. Height 20—30 ft. 1*s.* 6*d.*

Amýgdalus commùnis *E. of T.* p. 263. *A. B.* p. 674., the common Almond Tree. Height 20—30 ft. 2*s.* 6*d.*

Amýgdalus commùnis macrocárpa *E. of T.* p. 264. *A. B.* p. 675., the large-flowered Almond. 2*s.* 6*d.*

Armenìaca vulgàris *E. of T.* p. 267. *A. B.* p. 682., the common Apricot Tree. Height 20—30 ft. 2*s.* 6*d.*

Bétula nìgra *E. of T.* p. 843. *A. B.* p. 1710., the black Birch. Height 60—70 ft.

Bétula populifòlia *E. of T.* p. 841. *A. B.* p. 1707., the Poplar-leaved Birch. 1*s.* 6*d.*

Bétula populifòlia laciniàta *E. of T.* p. 841. *A. B.* p. 1707., the cut-leaved Poplar Birch. 1*s.* 6*d.*

Broussonètia papyrífera *E. of T.* p. 710. *A. B.* p. 1361., the Paper Mulberry. Height 10—20 ft. 1*s.* 6*d.*

Caragàna arboréscens *E. of T.* p. 237. *A. B.* p. 629., the Siberian Pea Tree. Height 15—20 ft. 1*s.* 6*d.*

Cérasus Pàdus *E. of T.* p. 289. *A. B.* p. 709., the Bird-Cherry Tree. Height 12—40 ft. 9*d.*

Cérasus virginiàna *E. of T.* p. 291. *A. B.* p. 710., the Virginian Bird-Cherry Tree. Height 30—40 ft. 1*s.* 6*d.*

Cércis Siliquástrum *E. of T.* p. 257. *A. B.* p. 657., the common Judas Tree. Height 20—30 ft. 1*s.* 6*d.* Abundant in the Protestant cemetery at Lisbon, and in the Turkish cemeteries at Constantinople. (*Yacht Voyage*, vol. i. p. 20. and p. 37.)

Córylus Colúrna *E. of T.* p. 923. *A. B.* p. 2029., the Constantinople Hazel, Height 50—60 ft. 2*s.* 6*d.*

Cratæ'gus *E. of T.* p. 352. *A. B.* p. 813., the Thorn. Fifty species, all beautiful. 2*s.* 6*d.* each.

Cydònia vulgàris *E. of T.* p. 450. *A. B.* p. 929., the common Quince Tree. Height 15—20 ft. 2*s.* 6*d.*

Cýtisus alpìnus *E. of T.* p. 215. *A. B.* p. 591., the Alpine, or Scotch, Laburnum. Height 20—30 ft. 1*s.* 6*d.*

Cýtisus Labúrnum *E. of T.* p. 214. *A. B.* p. 590., the common Laburnum. Height 20 ft. 1*s.*

Diospýros Lòtus *E. of T.* p. 625. *A. B.* p. 1194., the European Lotus, or common Date Plum. Height 20—30 ft. 2*s.* 6*d.*

Elæágnus horténsis *E. of T.* p. 696. *A. B.* p. 1321., the garden Elæagnus, Oleaster, or Wild Olive Tree. Height 15—20 ft. 1*s.* 6*d.*

Gledítschia sinénsis *E. of T.* p. 252. *A. B.* p. 654., the Chinese Gleditschia. Height 30—50 ft. 2*s.* 6*d.*

Halèsia tetráptera *E. of T.* p. 620. *A. B.* p. 1190., the common Snowdrop Tree. Height 15—30 ft. 2*s.* 6*d.*

Hippóphae Rhamnoïdes fémina *E. of T.* p. 698. *A. B.* p. 1324., the female Sea Buckthorn. Height 15—20 ft. 1*s.* 6*d.*

Kölreutèria paniculàta *E. of T.* p. 135. *A. B.* p. 475., the panicled-flowering Kolreuteria. Height 20—40 ft. 1*s.* 6*d.*

Magnòlia acuminàta *E. of T.* p. 29. *A. B.* p. 273., the pointed-leaved Magnolia. Height 30—50 ft. 5*s.*

Méspilus germánica *E. of T.* p. 415. *A. B.* p. 877., the common Medlar. 2*s.* 6*d.*

Méspilus Smíthii E. of T. p. 416. A. B. p. 878., Smith's Medlar. Height 15—20 ft. 2*s.* 6*d.*

Mòrus nìgra *E. of T.* p. 706. *A. B.* p. 1343. 3*s.* 6*d.*; and *M.* álba *E. of T.* p. 707. *A. B.* p. 1348. 1*s.*; the common-fruited and white-fruited Mulberry Tree. Height 20—30 ft.

Ptèlea trifoliàta *E. of T.* p. 144. *A. B.* p. 489., the three-leafleted Ptelea, or shrubby Trefoil. Height 6—10 ft. 1*s.* 6*d.*

Pỳrus *E. of T.* p. 417. *A. B.* p. 879., the Pear Tree. Ten species. 2*s.* 6*d.*

Quércus Æ'gilops *E. of T.* p. 860. *A. B.* p. 1861., the great prickly-cupped Oak. Height 20—50 ft. 2*s.* 6*d.*

Quércus E'sculus *E. of T.* p. 853. *A. B.* p. 1844., the Italian Oak. Height 20—30 ft. 2*s.* 6*d.*

Sambùcus nìgra laciniàta *E. of T.* p. 513. *A. B.* p. 1027., the common, or black-fruited, Elder. 1*s.*

Sambùcus racemòsa *E. of T.* p. 515. *A. B.* p. 1031., the racemose-flowered Elder. Height 10—12 ft. 1*s.* 6*d.*

Sophòra japónica *E. of T.* p. 196. *A. B.* p. 563., the Japan Sophora. Height 40—50 ft. 1*s.* 6*d.*

Virgília lùtea *E. of T.* p. 198. *A. B.* p. 565., the yellow-wooded Virgilia. Height 10—20 ft. 5*s.*

Deciduous Trees of larger Size, remarkable for the Beauty of their Flowers, or the Singularity or Fragrance of their Leaves.

A'cer Pseùdo-Plátanus purpùrea *E. of T.* p. 86. *A. B.* p. 415., the purple-leaved Sycamore Maple. 1*s.* The maple is the badge of the clan Oliphant.

Æ'sculus rubicúnda *E. of T.* p. 126. *A. B.* p. 467., the reddish-flowered Horsechestnut. Height 20—30 ft. 2*s.* 6*d.*

Ailántus glandulòsa *E. of T.* p. 145. *A. B.* p. 490., the glandulous-leaved Ailanto. Height 50—60 ft. 1*s.* 6*d.*

A'lnus cordifòlia *E. of T.* p. 835. *A. B.* p. 1689., the heart-leaved Alder. Height 15—20 ft. 1*s.* 6*d.*

A'lnus incàna *E. of T.* p. 834. *A. B.* p. 1687., the hoary-leaved Alder. Height 50—70 ft. 1*s.* 6*d.*

Céltis austràlis *E. of T.* p. 727. *A. B.* p. 1414., the European Nettle Tree. Height 30—40 ft. 2*s.* 6*d.*

Fàgus sylvática purpùrea *E. of T.* p. 905. *A. B.* p. 1950., the common purple Beech. 2*s.* 6*d.*

Liquidámbar Styracíflua *E. of T.* p. 932. *A. B.* p. 2049., the Sweet-Gum Liquidambar. Height 30—50 ft. 1*s.* 6*d.*

Liriodéndron Tulipífera *E. of T.* p. 36. *A. B.* p. 284., the Tulip Tree. Height 50—90 ft. 2*s.* 6*d.*

Maclùra aurantìaca *E. of T.* p. 711. *A. B.* p. 1362., the Osage Orange. Height 30—60 ft. 3*s.* 6*d.*

Negúndo fraxinifòlium *E. of T.* p. 122. *A. B.* p. 460., the Ash-leaved Negundo. Height 15—30 ft. 1*s.*

Pàvia díscolor *E. of T.* p. 133. *A. B.* p. 472., the two-coloured-flowered Pavia. Height 3—10 ft. 2*s.* 6*d.*

Pàv*ia* flàva *E. of T.* p. 130. *A. B.* p. 471., the yellow-flowered Pavia. Height 30—40 ft. 1*s*. 6*d*.
Plánera Richárdi E. of T. p. 726. A. B. p. 1409., Richard's Planera. Height 50—70 ft. 1*s*. 6*d*.
*P*látanus orientàlis *E. of T.* p. 928. *A. B.* p. 2033., the Oriental Plane. Height 60—80 ft. 1*s*. 6*d*.
*P*ópulus balsamífera *E. of T.* p. 830. *A. B.* p. 1673., the Balsam-bearing Poplar. Height 40—50 ft. 1*s*.
Quércus coccínea *E. of T.* p. 869. *A. B.* p. 1879., the Scarlet Oak. Height 80 ft. 1*s*. 6*d*.
Quércus palústris *E. of T.* p. 872. *A. B.* p. 1887., the Marsh, or Pin, Oak. Height 80 ft. 1*s*. 6*d*.
Quércus rùbra *E. of T.* p. 868. *A. B.* p. 1877., the red, or Champion, Oak. Height 80—90 ft.
Robín*ia* Pseùd-*A*càcia *E. of T.* p. 233. *A. B.* p. 609., the common Robinia, or false Acacia. Height 70—80 ft. 1*s*.
Robín*ia* viscòsa *E. of T.* p. 235. *A. B.* p. 626., the clammy-barked Robinia. Height 15—20 ft. 2*s*. 6*d*.
Salisbùr*ia* *a*diantifòlia *E. of T.* p. 945. *A. B.* p. 2094., the Maiden-hair-leaved Salisburia. Height 60—80 ft. 3*s*. 6*d*.
*S*àlix aurìta *E. of T.* p. 776. *A. B.* p. 1560., the round-eared Sallow, or Willow. 1*s*. 6*d*. The badge of the clan Cumming.
*S*àlix càprea *E. of T.* p. 776. *A. B.* p. 1561., the Goat Sallow, or Willow. Height 15—30 ft. 1*s*. 6*d*.
*S*àlix pentándra *E. of T.* p. 754. *A. B.* p. 1503., the Sweet Willow, or Bay-leaved Willow. Height 18—20 ft. 1*s*. 6*d*.
*S*àlix vitellìna *E. of T.* p. 763. *A. B.* p. 1528., the yellow Willow, or Golden Osier. Height 30—50 ft. 1*s*. 6*d*.

Deciduous Trees with pendulous Branches, adapted for being planted singly by Monuments, or over Graves as Substitutes for Monuments (Trauerbäume, or Trees of Sorrow, Ger.).

*A*mýgdalus *P*érsica péndula (*Rivers*) *G. M.* 1843, p. 57., the pendulous-branched Peach.
*B*étula álba péndula *E. of T.* p. 838. *A. B.* p. 1691., the weeping Birch. 1*s*. The birch is the badge of the clan Buchanan.
*C*érasus *P*àdus bracteòsa *E. of T.* p. 290. *A. B.* p. 702., the bracteolate weeping Bird-Cherry. 1*s*. 6*d*.
*C*érasus *P*àdus péndula (*Rivers*) *G. M.* 1843, p. 57., the weeping Bird-Cherry.
*C*érasus semperflòrens *E. of T.* p. 281. *A. B.* p. 701., the ever-flowering Cherry Tree. Height 10—20 ft. 1*s*. 6*d*.
*C*ratæ̀gus *O*xyacántha péndula *E. of T.* p. 376. *A. B.* p. 832., the weeping Hawthorn.
*C*ýtisus *L*abúrnum péndulum *E. of T.* p. 215. *A. B.* p. 590., the weeping Laburnum. 2*s*. 6*d*.
*C*ýtisus alpìnus péndulus *E. of T.* p. 216. *A. B.* p. 791., the weeping Scotch Laburnum. Height 20—30 ft. 2*s*. 6*d*.
*F*àgus sylvática péndula *E. of T.* p. 906. *A. B.* p. 1876., the weeping Beech. 3*s*. 6*d*.
*F*àgus sylvática purpùrea péndula (*Rivers*) *G. M.* 1843, p. 60., the purple weeping Beech.
*F*ráxinus excélsior péndula *E. of T.* p. 641. *A. B.* p. 1214., the weeping Ash. 3*s*. 6*d*.
*F*ráxinus *l*entiscifòlia péndula *E. of T.* p. 645. *A. B.* p. 1231., the weeping Lentiscus-leaved Ash. 3*s*. 6*d*.
Pàv*ia* rùbra péndula, the weeping Horsechestnut. 2*s*. 6*d*.
*P*ópulus trémula péndula *E. of T.* p. 822. *A. B.* p. 1509., the weeping Poplar. 1*s*. 6*d*. The poplar is the badge of the clan Ferguson.

*P*ỳrus spùria péndula *E. of T.* p. 445. *A. B.* p. 925., the spurious Service Tree. Height 10—12 ft. 2*s*. 6*d*.

Quércus pedunculàta péndula *E. of T.* p. 849. *A. B.* p. 1731., the weeping Oak.

Robín*ia* Pseùd-*A*càcia péndula *E. of T.* p. 234. *A. B.* p. 609. *Gard. Mag.* 1843, p. 56., the false Acacia.

*S*àlix babylónica *E. of T.* p. 757. *A. B.* p. 1507., the weeping Willow. Height 30—50 ft. 1*s*.

*S*àlix americàna péndula (*Rivers*) *Gard. Mag.* 1843, p. 59., the American weeping Willow.

Sophòra japónica péndula *E. of T.* p. 196. *A. B.* p. 563., the weeping Sophora. Height 30—40 ft. 10*s*. 6*d*.

*T*ília álba péndula, the white Hungarian Lime. 3*s*. 6*d*.

U'lmus montàna péndula *E. of T.* p. 721. *A. B.* p. 1398., the weeping Elm. 2*s*. 6*d*.

EVERGREEN SHRUBS.

Evergreen Shrubs with Needle Leaves, and the Plants of great Duration, all well adapted for Cemeteries where Shrubs are introduced.

*C*upréssus *t*hyöìdes *E. of T.* p. 1074. *A. B.* p. 2475., the white Cedar. Height 10—15 ft. 2*s*. 6*d*.

*J*uníperus commùnis *E. of T.* p. 1081. *A. B.* p. 2489., the common Juniper. Height 3—5 ft. 1*s*. The badge of the clan Murray.

*J*uníperus däùrica *E. of T.* p. 1082. *A. B.* p. 2489., the Daürian Juniper.

*J*uníperus *O*xýcedrus *E. of T.* p. 1083. *A. B.* p. 2494., the brown-berried Juniper. Height 10—12 ft. 3*s*. 6*d*.

*J*uníperus *S*abìna *E. of T.* p. 1085. *A. B.* p. 2499., the common Savin. Height 7—8 ft. 1*s*. 6*d*. Several varieties.

*T*àxus baccàta microphýlla (*Rivers*) *Gard. Mag.* 1843, p. 60.

*T*àxus canadénsis *E. of T.* p. 942. *A. B.* p. 2093., the Canada, or North American, Yew. 3*s*. 6*d*.

Evergreen Shrubs with broad Leaves, and the Plants of great Duration.

A'rbutus *U*'nedo *E. of T.* p. 573. *A. B.* p. 1117., and several other species. From 6*d*. to 5*s*. The arbutus is the badge of the clan Ross.

Aúcuba japónica *E. of T.* p. 511. *A. B.* p. 1026., the Japan Aucuba. Height 6—10 ft. 1*s*. 6*d*.

Bérberis dúlcis *E. of T.* p. 47. *A. B.* p. 305., the sweet-fruited Berberry. Height 2—5 ft. 1*s*. 6*d*.

*B*úxus sempervìrens *m*yrtifòlia *E. of T.* p. 704. *A. B.* p. 1333., the Myrtle-leaved Box Tree. 9*d*.

Collèt*ia* hórrida *E. of T.* p. 176. *A. B.* p. 541., the bristly Colletia. Height 3—4 ft. 3*s*. 6*d*.

Cotoneáster *b*uxifòlia *E. of T.* p. 411. *A. B.* p. 873., the Box-leaved Cotoneaster. 1*s*. 6*d*.

*C*ratæ'gus *P*yracántha *E. of T.* p. 385. *A. B.* p. 844., the fiery Thorn. Height 4—6 ft. 1*s*. 6*d*.

*D*áphne Laurèola *E. of T.* p. 688. *A. B.* p. 1309., the Spurge Laurel. Height 3—4 ft. 6*d*.

*D*áphne póntica *E. of T.* p. 688. *A. B.* p. 1310., the twin-flowered Spurge Laurel. Height 4—5 ft. 1*s*. 6*d*.

Gárry*a* ellíptica *E. of T.* p. 926. *A. B.* p. 2032., the elliptic-leaved Garrya. Height 8—10 ft. 2*s*. 6*d*.

I'lex *A*quifòlium *E. of T.* p. 157. *A. B.* p. 505., the common Holly: most of the variegated sorts. Height 20—30 ft. 1*s*. to 5*s*.

*L*igústrum vulgàre sempervìrens *E. of T.* p. 629. *A. B.* p. 1199., the evergreen Privet. 6*d*.

*Ph*illýrea mèdia *E. of T.* p. 632. *A. B.* p. 1204., the lance-leaved Phillyrea. Height 10—15 ft. 2*s.* 6*d.*

Quércus hýbrida nàna *E. of T.* p. 886. *A. B.* p. 1924., the dwarf hybrid Oak.

*R*hámnus *A*latérnus *E. of T.* p. 171. *A. B.* p. 529., the Alaternus. Height 10—20 ft. 1*s.* 6*d.*

*R*hámnus hýbridus *E. of T.* p. 172. *A. B.* p. 531., the hybrid Alaternus. Height 10—12 ft. 1*s.* 6*d.*

U'lex europæ'a fl. plèno *E. of T.* p. 200. *A. B.* p. 571., the double-blossomed Furze. 1*s.*

*V*ibúrnum *T*ìnus *E. of T.* p. 516. *A. B.* p. 1032., the Laurustinus. Height 8—10 ft. 1*s.*

DECIDUOUS SHRUBS.

Deciduous broad-leaved Shrubs, the Plants of compact Growth and of long Duration, adapted for Cemeteries.

A'lnus víridis *E. of T.* p. 836. *A. B.* p. 1689., the green-leaved Alder. Height 5—6 ft.

Bérberis aristàta *E. of T.* p. 49. *A. B.* p. 307., the bristled-tooth-leaved Berberry. Height 6—10 ft. 1*s.* 6*d.*

Bérberis asiática *E. of T.* p. 49. *A. B.* p. 306., the Asiatic Berberry. Height 6—8 ft. 3*s.* 6*d.*

Bérberis crética *E. of T.* p. 44. *A. B.* p. 304., the Cretan Berberry. Height 3—4 ft. 2*s.* 6*d.*

Bérberis ibérica *E. of T.* p. 45. *A. B.* p. 304., the Iberian Berberry. Height 3—5 ft. 1*s.* 6*d.*

Bérberis sibírica *E. of T.* p. 42. *A. B.* p. 301., the Siberian Berberry. Height 2—3 ft. 2*s.* 6*d.*

Bérberis sinénsis *E. of T.* p. 46. *A. B.* p. 304., the Chinese Berberry. Height 3—5 ft. 2*s.* 6*d.*

Bérberis vulgàris *E. of T.* p. 42. *A. B.* p. 301., the common Berberry. Height 6—10 ft. 1*s.* 6*d.*

*B*étula nàna *E. of T.* p. 840. *A. B.* p. 1705., the dwarf Birch. Height 6—8 ft. 1*s.* 6*d.*

*B*étula pùmila *E. of T.* p. 840. *A. B.* p. 1705., the hairy dwarf Birch. Height 2—3 ft. 1*s.* 6*d.*

Caragàna arborèscens *E. of T.* p. 237. *A. B.* p. 629., the Siberian Pea Tree. Height 15—20 ft. 1*s.* 6*d.*

Cérasus hyemàlis *E. of T.* p. 285. *A. B.* p. 704., the Winter Cherry Tree. Height 3—4 ft. 1*s.* 6*d.*

Cérasus nìgra *E. of T.* p. 284. *A. B.* p. 704., the black Cherry Tree. Height 6—10 ft. 2*s.* 6*d.*

Chimonánthus fràgrans *E. of T.* p. 445. *A. B.* p. 938., the fragrant-flowered Chimonanthus. Height 6—8 ft. 3*s.* 6*d.*

Chionánthus virgínica *E. of T.* p. 634. *A. B.* p. 1206., the Fringe Tree. Height 10—30 ft. 2*s.* 6*d.*

Córnus álba *E. of T.* p. 503. *A. B.* p. 1011., the white-fruited Dogwood. Height 4—10 ft. 9*d.*

Córnus álba stricta *E. of T.* p. 503. *A. B.* p. 1012., the straight-branched Dogwood. Height 6—10 ft. 1*s.* 6*d.*

Córnus alternifòlia *E. of T.* p. 501. *A. B.* p. 1010., the alternate-leaved Dogwood. Height 15—20 ft. 1*s.*

Córnus más *E. of T.* p. 505. *A. B.* p. 1014., the Cornelian Cherry Tree. Height 12—20 ft. 1*s.* 6*d.*

Córnus sanguínea *E. of T.* p. 502. *A. B.* p. 1010., the common Dogwood. Height 4—15 ft. 9*d.*

Córylus *A*vellàna *E. of T.* p. 921. *A. B.* p. 2017., the common Hazel. Height 20 ft. 9*d.* The badge of the clan Colquhoun.

Córylus *A*vellàna purpùrea, the purple-leaved Hazel. 1*s.* 6*d.*

Cotoneáster frígida *E. of T.* p. 407. *A. B.* p. 871., the frigid Cotoneaster. Height 10—20 ft. 2*s.* 6*d.*

Cotoneáster frígida affìnis *E. of T.* p. 408. *A. B.* p. 871., the related Cotoneaster. Height 10—20 ft. 1*s.* 6*d.*

Cotoneáster nummulària *E. of T.* p. 409. *A. B.* p. 872., the money-like-leaved Cotoneaster. Height 10—15 ft. 1*s.* 6*d.*

Cotoneáster vulgàris *E. of T.* p. 406. *A. B.* p. 870., the common Cotoneaster. Height 4—5 ft. 1*s.* 6*d.*

*C*ratæ'gus parvifòlia *E. of T.* p. 383. *A. B.* p. 841., the small-leaved Thorn. Height 4—6 ft. 3*s.* 6*d.*

*C*ratæ'gus virgínica *E. of T.* p. 384. *A. B.* p. 842., the Virginian Thorn. Height 4—5 ft.

*C*ydònia japónica *E. of T.* p. 452. *A. B.* p. 931., the Japan Quince Tree. Height 5—6 ft. 1*s.* 6*d.*

*C*ydònia sinénsis *E. of T.* p. 451. *A. B.* p. 931., the China Quince Tree. Height 10—12 ft. 2*s.* 6*d.*

*D*àphne *Mezèreum* E. of T. p. 687. A. B. p. 1307., the common Mezereon. Height 3—4 ft. 1*s.*

*E*uónymus europæ'us *E. of T.* p. 149., *A. B.* p. 496., the Spindle Tree. Height 6—12 ft. 9*d.*

*E*uónymus latifòlius *E. of T.* p. 150. *A. B.* p. 498., the broad-leaved Euonymus, or Spindle Tree. Height 10—20 ft. 1*s.* 6*d.*

Gledítschi*a* sinénsis purpùrea *E. of T.* p. 252. *A. B.* p. 654., the Chinese Gleditschia. 2*s.* 6*d.*

*H*amamèlis virgínica *E. of T.* p. 499. *A. B.* p. 1007., the Wych Hazel. Height 20—30 ft. 2*s.* 6*d.*

*L*igústrum vulgàre *E. of T.* p. 629. *A. B.* p. 1198., the common Privet. Height 6—10 ft. 4*d.*

*P*aliùrus aculeàtus *E. of T.* p. 168. *A. B.* p. 527., Christ's Thorn. Height 15—20 ft. 1*s.* 6*d.*

Pàvi*a* macrostàchya *E. of T.* p. 133. *A. B.* p. 473., the long-racemed Pavia. Height 10—15 ft. 2*s.* 6*d.*

*P*hiladélphus coronàrius *E. of T.* p. 460. *A. B.* p. 951., the Mock Orange. Height 10—12 ft. 9*d.*

*P*rìnos decíduus *E. of T.* p. 164. *A. B.* p. 520., the deciduous Winter Berry. Height 3—5 ft. 1*s.* 6*d.*

*P*rùnus marítima *E. of T.* p. 275. *A. B.* p. 691., the sea-side-inhabiting Plum Tree. Height 6—8 ft. 2*s.* 6*d.*

*P*rùnus spinòsa *E. of T.* p. 271. *A. B.* p. 684., the common Sloe Thorn. Height 10—15 ft. 1*s.* 6*d.*

*P*ỳrus *a*rbutifòlia *E. of T.* p. 446. *A. B.* p. 925., the Arbutus-leaved Aronia. Height 4—6 ft. 2*s.* 6*d.*

*P*ỳrus Chamæméspilus *E. of T.* p. 449. *A. B.* p. 928., the dwarf Medlar. Height 5—6 ft. 1*s.* 6*d.*

*P*ỳrus pùbens *E. of T.* p. 448. *A. B.* p. 927., the downy-branched Aronia. Height 4—5 ft. 3*s.* 6*d.*

*P*ỳrus spùria *E. of T.* p. 444. *A. B.* p. 924., the spurious Service Tree. Height 10—20 ft. 2*s.* 6*d.*

Quércus Banísteri E. of T. p. 876. A. B. p. 1893., the Holly-leaved, or Bear, Oak. Height 3—10 ft.

*R*hámnus alpìnus *E. of T.* p. 175. *A. B.* p. 536., the Alpine Buckthorn. Height 5—10 ft. 1*s.*

*R*hámnus cathárticus *E. of T.* p. 172. *A. B.* p. 531., the purging Buckthorn. Height 10—12 ft. 1*s.*

*R*hámnus Frángula *E. of T.* p. 177. *A. B.* p. 539., the breaking Buckthorn, or Berry-bearing Alder. Height 8—10 ft. 1*s.* 6*d.*

*R*hámnus latifòlius *E. of T.* p. 177. *A. B.* p. 538., the broad-leaved Buckthorn. Height 10—15 ft. 1*s.* 6*d.*

*R*hús Cótinus *E. of T.* p. 187. *A. B.* p. 549., the Venetian Sumach. Height 4—6 ft. 1*s.* 6*d.*

*R*hús glàbra *E. of T.* p. 188. *A. B.* p. 551., the Scarlet Sumach. Height 5—18 ft. 1*s.* 6*d.*

*R*hús typhìna *E. of T.* p. 187. *A. B.* p. 550., the Stag's Horn Sumach. Height 20 ft. 9*d.*

*R*hús venenàta *E. of T.* p. 189. *A. B.* p. 552., the poisonous Rhus, Poison Wood, or Swamp Sumach. Height 15—20 ft. 1*s.* 6*d.*

*S*ambùcus racemòsa *E. of T.* p. 515. *A. B.* p. 1031., the racemose-flowered Elder. Height 10—12 ft. 1*s.* 6*d.*

Shephérd*ia* argéntea *E. of T.* p. 700. *A. B.* p. 1327., the silver-leaved Shepherdia. Height 12—18 ft. 1*s.* 6*d.*

Shephérd*ia* canadénsis *E. of T.* p. 700. *A. B.* p. 1327., the Canadian Shepherdia. Height 6—8 ft. 2*s.* 6*d.*

*S*piræ'a *a*riæfòlia *E. of T.* p. 309. *A. B.* p. 731., the White-Beam-tree-leaved Spiræa. Height 6—8 ft. 1*s.*

*S*piræ'a *c*hamædrifòlia *E. of T.* p. 300. *A. B.* p. 724., the Germander-leaved Spiræa. Height 2—8 ft. 9*d.*

*S*piræ'a *h*ypericifòlia *E. of T.* p. 303. *A. B.* p. 726., the Hypericum-leaved Spiræa. Height 4—6 ft. 9*d.*

*S*piræ'a opulifòlia *E. of T.* p. 299. *A. B.* p. 723., the Virginian Guelder Rose. Height 8—10 ft. 9*d.*

Staphylèa trifòlia *E. of T.* p. 147. *A. B.* p. 493., the Bladder-nut Tree. Height 6—12 ft. 1*s.*

Symphoricárpos montànus *E. of T.* p. 542., the Mountain St. Peter's Wort. Height 5—6 ft. 1*s.*

Symphoricárpos vulgàris *E. of T.* p. 541. *A. B.* p. 1058., the common St. Peter's Wort. Height 3—6 ft. 9*d.*

Syrínga Josikæ'*a* E. of T. p. 637. A. B. p. 1201., Josika's Lilac. Height 6—12 ft. 1*s.* 6*d.*

Syrínga pérsica *E. of T.* p. 637. *A. B.* p. 1211., the Persian Lilac. Height 4—6 ft. 9*d.*

Syrínga rothomagénsis *E. of T.* p. 637. *A. B.* p. 1212., the Rouen Lilac. Height 6—8 ft. 9*d.*

Syrínga vulgàris *E. of T.* p. 636. *A. B.* p. 1209., the common Lilac. Height 8—10 ft. 9*d.*

Syrínga vulgàris álba *E. of T.* p. 636. *A. B.* p. 1209., the common White Lilac. 9*d.*

*V*ibúrnum dentàtum *E. of T.* p. 521. *A. B.* p. 1038., the toothed-leaved Viburnum. Height 4—6 ft. 1*s.*

*V*ibúrnum Lantàna *E. of T.* p. 520. *A. B.* p. 1035., the Wayfaring Tree. Height 12—15 ft. 1*s.*

*V*ibúrnum Lentàgo *E. of T.* p. 517. *A. B.* p. 1033., the Lentago, or pliant-branched Viburnum. Height 6—10 ft. 1*s.* 6*d.*

*V*ibúrnum O'pulus *E. of T.* p. 522. *A. B.* p. 1039., the Guelder Rose. Height 6—12 ft. 9*d.*

Xanthóxylum *f*raxíneum *E. of T.* p. 142. *A. B.* p. 488., the common Toothache Tree. Height 10—15 ft. 2*s.* 6*d.*

LOW TREES AND SHRUBS FOR WALLS.

Select low Trees or Shrubs for a Cemetery or Churchyard Wall, where the Expense of Training is not an Object.

* Evergreen or Subevergreen.

A'rbutus *A*ndráchne *E. of T.* p. 575. *A. B.* p. 1120., the Strawberry Tree. Height 20—30 ft. 5*s.*

Aristotèl*ia* *Mácqui* E. of T. p. 183. A. B. p. 543., the Macqui Aristotelia. Height 6 ft. 1*s.* 6*d.*

*C*eanòthus azùreus *E. of T.* p. 180. *A. B.* p. 539., the Red Root. Height 6—10 ft. 2*s.* 6*d.*

*C*ratæ'gus mexicàna *E. of T.* p. 384. *A. B.* p. 843., the Mexican Thorn. Height 10—15 ft. 2*s.* 6*d.*

Escallòn*ia* rùbra *E. of T.* p. 490. *A. B.* p. 993., the red-flowered Escallonia. Height 3—6 ft. 1*s.* 6*d.*

*E*uónymus japónicus *E. of T.* p. 153. *A. B.* p. 501. 1*s.* 6*d.*

*L*aúrus nóbilis *E. of T.* p. 681. *A. B.* p. 1297., the Sweet Bay. Height 30—60 ft. 1*s.* 6*d.*

*L*igústrum lùcidum *E. of T.* p. 630. *A. B.* p. 1201., the shining-leaved Privet, or Wax Tree. Height 10—20 ft. 1*s.* 6*d.*

Magnòl*ia* grandiflòra *E. of T.* p. 22. *A. B.* p. 261., the large-flowered Magnolia. Height 20—30 ft. 3*s.* 6*d.*

Mahòn*ia* fasciculàris *E. of T.* p. 50. *A. B.* p. 309., the Ash Berberry. Height 5—8 ft. 7*s.* 6*d.*

Photínia serrulàta *E. of T.* p. 404. *A. B.* p. 868., the serrulated-leaved Photinia. Height 12—15 ft. 2*s.* 6*d.*

Yúcca gloriòsa *E. of T.* p. 1101. *A. B.* p. 2521., the glorious Adam's Needle. Height 5 ft. 5*s.*

** Deciduous.

*A*mýgdalus orientàlis *E. of T.* p. 265. *A. B.* p. 679., the Eastern Almond Tree. Height 8—10 ft. 2*s.* 6*d.*

Búddle*a* globòsa *E. of T.* p. 670. *A. B.* p. 1276. the globe-flowered Buddlea. Height 12—15 ft. 1*s.* 6*d.*

Deùtz*ia* scàbra *E. of T.* p. 466. *A. B.* p. 950, the scabrous Deutzia. Height 4—6 ft. 1*s.* 6*d.*

*H*ibíscus syrìacus *E. of T.* p. 62. *A. B.* p. 362., the Althæa Frutex. Height 6 ft. Nine varieties. From 6*d.* to 1*s.*

Magnòl*ia* conspícua *E. of T.* p. 33. *A. B.* p. 278., the Yulan, or conspicuous-flowered Magnolia. Height 20—30 ft. 5*s.*

Magnòl*ia* c. Soulange*àna* E. of T. p. 33. A. B. p. 272., Soulange's Magnolia. Height 15—20 ft. 5*s.*

Magnòl*ia* cordàta *E. of T.* p. 30. *A. B.* p. 275., the heart-leaved Magnolia. Height 20—30 ft. 3*s.* 6*d.*

Magnòl*ia* purpùrea *E. of T.* p. 35. *A. B.* p. 282., the purple-flowered Magnolia. Height 3—5 ft. 2*s.* 6*d.*

Ribes aúreum præ'cox *E. of T.* p. 487. *A. B.* p. 989., the golden-flowered Currant. 1*s.*

Ribes Menzièsii E. of T. p. 475. Menzies's Gooseberry. Height 4—5 ft. 1*s.* 6*d.*

Ribes sanguíneum *E. of T.* p. 486. *A. B.* p. 988., the bloody, or red-flowered, Currant. Height 4—8 ft. 9*d.*

Ribes speciòsum *E. of T.* p. 474. *A. B.* p. 974., the showy-flowered Gooseberry. Height 4—8 ft. 1*s.* 6*d.*

Robín*ia* híspida *E. of T.* p. 236. *A. B.* p. 627., the Rose Acacia. Height 6—20 ft. 1*s.* 6*d.*

Robín*ia* macrophýlla *E. of T.* p. 237. *A. B.* p. 628., the large-leaved Rose Acacia. 1*s.* 6*d.*

Robín*ia* ròsea *E. of T.* p. 237. *A. B.* p. 627., the rosy-flowered Rose Acacia. 1*s.* 6*d.*

CLIMBERS.

*

Climbing Shrubs adapted for a Wall where the Ground is not dug.

* Evergreen.

*H*édera *H*èlix *E. of T.* p. 497. *A. B.* p. 1000., the common Ivy. Height 20—60 ft. Seven varieties, all beautiful. From 6*d.* to 1*s.* 6*d.* The badge of the clan Gordon.

** Deciduous.

Ampelópsis *h*ederàcea *E. of T.* p. 139. *A. B.* p. 482., the five-leaved Ivy. Height 30—50 ft. 1*s.* 6*d.*

*A*ristolòchia sìpho *E. of T.* p. 701. *A. B.* p. 1329., the tube-flowered Birthwort. Height 15—30 ft. 2*s.* 6*d.*

*C*lématis Flámmula *E. of T.* p. 3. *A. B.* p. 233., the sweet-scented Virgin's Bower. Height 10—15 ft. 1*s.* 6*d.*

*C*lématis Vitálba *E. of T.* p. 5. *A. B.* p. 235., the Traveller's Joy. Height 15—30 ft. 1*s.*

*J*asmìnum officinàle *E. of T.* p. 656. *A. B.* p. 1250., the common Jasmine. Height 40—50 ft. 1*s.*

Lonícer*a* E. of T. p. 526. A. B. p. 1042., the Honeysuckle. Ten sorts. From 6*d.* to 1*s.* 6*d.*

*L*ýcium bárbarum *E. of T.* p. 666. *A. B.* p. 1270., the Barbary Box Thorn. Height 20—30 ft. 9*d.*

Menispérmum canadénse *E. of T.* p. 40. *A. B.* p. 296., male and female, the Canadian Moonseed. Height 8—12 ft. 1*s.* 6*d.*

Períploca græ'ca *E. of T.* 659. *A. B.* p. 1257., the Greek Periploca. Height 20—30 ft. 2*s.* 6*d.*

Physiánthus álbicans *E. of T.* p. 659. *A. B.* p. 2581. 2*s.* 6*d.*

*R*hús radìcans *E. of T.* p. 190. *A. B.* p. 555., the rooting-branched Sumach. Height 10—20 ft. 1*s.* 6*d.*

*R*hús suavèolens *E. of T.* p. 191. *A. B.* p. 557., the sweet-scented Sumach. Height 1—4 ft. 1*s.* 6*d.*

*R*hús Toxicodéndron *E. of T.* p. 190. *A. B.* p. 556., the Poison-tree Rhus, or Sumach. Height 10—20. 1*s.* 6*d.*

*R*òsa arvénsis *E. of T.* p. 344. *A. B.* p. 772. Several varieties, quite hardy. From 6*d.* to 2*s.* 6*d.*

*V*ìtis cordifòlia *E. of T.* p. 138. *A. B.* p. 480., the Chicken Grape. Height 10—20 ft.

*V*ìtis *L*abrúsca *E. of T.* p. 137. *A. B.* p. 479., the Fox Grape. Height 10—30 ft. 2*s.* 6*d.*

*V*ìtis ripària *E. of T.* p. 138. *A. B.* p. 480., the river-side, or sweet-scented, Vine. Height 20—30 ft. 2*s.* 6*d.*

*V*ìtis vinífera *a*piifòlia *E. of T.* p. 137. *A. B.* p. 478., the Parsley-leaved Grape Vine. 2*s.* 6*d.*

*V*ìtis vinífera fòliis incànis *E. of T.* p. 137. *A B.* p. 478., the hoary-leaved Grape Vine. 2*s.* 6*d.*

*V*ìtis vinífera fòliis rubescéntibus *E. of T.* p. 137. *A. B.* p. 478., the Claret Grape. 2*s.* 6*d.*

Wistàri*a* frutéscens *E. of T.* p. 249. *A. B.* p. 647., the shrubby Wistaria. Height 20—30 ft. 1*s.* 6*d.*

Wistàri*a* chinénsis *E. of T.* p. 249. *A. B.* p. 648., the Chinese Wistaria. Height 50—120 ft. 2*s.* 6*d.*

Climbing Shrubs where there is a dug Border.

* Evergreen or Subevergreen.

Bignòni*a* capreolàta *E. of T.* p. 660. *A. B.* p 1259., the tendriled Bignonia, or Trumpet Flower. Height 15—20. 2*s.* 6*d.*

Lonícer*a* gràta *E. of T.* p. 531. *A. B.* p. 1048 , the pleasant, or evergreen, Honeysuckle. Height 15—20 ft. 1*s.* 6*d.*

Lonícer*a* sempervìrens *E. of T.* p. 531. *A. B.* p. 1049., the evergreen Trumpet Honeysuckle. Height 6—10 ft. 1*s.*

*R*òsa sempervìrens *E. of T.* p. 345. *A. B.* p. 773., the evergreen (Field) Rose. Height 20—40 ft. 1*s.*

** Deciduous.

Lonícer*a* E. of T. p. 526. A. B. p. 1042., the Honeysuckle. Several species and varieties.

*R*òsa *E. of T.* p. 321. *A. B.* p. 748., the Rose Tree. Several species. From 4*d*. to 2*s*.

UNDERSHRUBS.

Undershrubs of very small Size, frequently planted over Graves.

* Evergreen.

*V*ínca màjor and mìnor, the greater and lesser Periwinkle, 6*d*. Common in burying-grounds in the Tyrol, and probably used there in consequence of the notice of the plant by Rousseau: "*Voilà la Pervenche!*"

*H*ypéricum calycìnum, the Tutsan St. John's Wort. 4*d*.

*R*osmarìnus officinàlis, the common Rosemary. 4*d*.

*R*ùta gravèolens, the common Rue. 4*d*.

*Th*ŷmus vulgàris, the common Thyme. 2*d*.

Lavándula Spìca, the common Lavender. 3*d*.

Oxycóccus palústris, the common Cranberry. 6*d*. The badge of the clan Grant.

*V*accínium *V*ìtis idæ'a, the red Whortleberry, or Cowberry. 6*d*. The badge of the clan Macleod.

*E'*mpetrum nìgrum, the Crowberry. 6*d*. The badge of the clan M'Lean.

Callùna vulgàris, the Ling. 6*d*. The badge of the clan Macdonell.

*E*rìca *T*étralix, the cross-leaved Heath. 6*d*. The badge of the clan Macdonald.

*E*rìca cinèrea, the fine-leaved Heath. 6*d*. The badge of the clan Macalister.

** Deciduous.

*A*rtemís*ia A*bsínthium, the common Southernwood. 3*d*.

*S*àlix herbàcea, the herbaceous Willow. 6*d*.

*H*ypéricum Kalm*iànum*, Kalm's St. John's Wort. 6*d*. Common in the cemeteries at Carlsruhe, and in other parts of Baden and Würtemberg.

*H*ypéricum elàtum, hircìnum, and prolíficum. 6*d*. each.

*A*ndrosæ'mum officinàle, the common Tutsan. 6*d*.

*M*yrìca *Gàle*, the sweet Gale. 6*d*. The badge of the clan Campbell.

*R*ùbus saxátilis, the Roebuck-berry. 6*d*. The badge of the clan Macnab.

SHRUBS FOR GRAFTING STANDARD HIGH.

List of Shrubs which, when grafted standard high, form ornamental Plants of singular Shapes and Habits of Growth, well adapted for planting singly beside Graves or Tombstones, for marking any particular Spot, or for creating Variety in a Shrubbery Walk, or in the Glades of a Pleasure-Ground. The price varies from 2*s*. 6*d*. to 7*s*. 6*d*.

* Evergreen.

*A*rctostáphylos U'va úrsi.
*A'*rbutus alpìna.
Cotoneáster rotundifòlia, microphýlla, and *b*uxifòlia.
*P*hillýrea, all the sorts on the Evergreen Privet.
*Th*ùja péndula, on the common Arbor Vitæ.
*P*ìnus *P*ínea, on *P*. sylvéstris.
*P*ìnus pumílio, on *P*. sylvéstris.
*P*ìnus Banks*iàna*, on *P*. sylvéstris.
*P*ìnus ìnops, on *P*. sylvéstris.

** Deciduous.

Calóphaca wolgárica.
Caragàna pygmæ'a.
Caragàna spinòsa.
*Caragàna t*ragacanthoìdes.

Caragàna Chamlàgu.
*C*érasus *C*hamæcérasus.
*C*érasus prostràta.
*C*érasus pùmila.
*C*érasus depréssa.
*C*érasus pygmæ'a.
*C*ýtisus sessilifòlius.
*C*ýtisus alpìnus, on *C.* Labúrnum.
*C*ýtisus *s*copàrius, the common Broom, on *C.* Labúrnum.
*C*ýtisus *s*copàrius álbus.
*C*ýtisus purpùreus, on *C.* Labúrnum.
*F*ráxinus excélsior aúrea, and other varieties.
*G*enísta tríquetra.
Halimodéndron argénteum.
*J*asmìnum officinàle, and other species, on the common Ash, or on the common Lilac.
Pàv*ia* díscolor.
Pàv*ia* rùbra hùmilis.
Pàv*ia* macrostàchya.
*P*ỳrus spùria.
*P*ỳrus spùria péndula.
*P*ỳrus *a*rbutifòlia.
*P*ỳrus *a*rbutifòlia serótina.
*P*ỳrus melanocárpa.
*P*ỳrus floribúnda. *P.* depréssa.
Robín*ia* Pseud-*A*càcia umbraculífera.
Robín*ia* Pseud-*A*càcia tortuòsa.
*S*àlix purpùrea. *S.* herbàcea.
*S*pártium *j*únceum, on the Laburnum.
Syrínga pérsica, and its varieties, on the common Ash.
Syrínga vulgàris, on the common Ash.
Técoma radìcans, on the Catalpa.

PERENNIAL HERBACEOUS PLANTS.

Perennial herbaceous Plants adapted for Cemeteries and Churchyards.

For planting in dug ground, whether in beds or over graves, every description of herbaceous plant, except those which require peat soil, is eligible; but for planting on turf to form single specimens, or what gardeners call "lawn plants," a selection requires to be made of such as have peculiar properties. These are: considerable bulk above ground; great natural hardiness of stem and foliage and durability of root; under-ground buds, or strong surface stocks, that will be secure from injury during the winter or dormant season; a compact habit of growth both of the roots and top; and sufficient natural vigour not to be injured by the compact texture of a grassy surface. The common pæony, the rhubarb, and the asparagus, are good examples of the kind of plant required; and the following list includes such plants, and a few others which may be procured in the principal botanic gardens and nurseries. The prices, when a single plant is ordered, vary from 3*d.* to 1*s.* 6*d.*

Herbaceous Perennials with strong under-ground Buds, and compact Heads that do not require the Support of Stakes.

*C*lématis ochroleùca, the yellowish white Virgin's Bower. Height 2 ft.
*T*halíctrum màjus, the greater Meadow Rue. Height 3 ft.
*A*conìtum variegàtum, the variegated Aconite. Height 5 ft.
*A*ctæ'a spicàta, the spiked Bane-berry. Height 3 ft. The berries are poison.
*P*æòn*ia* albiflòra, *P.* officinàlis, *P.* tenuifòlia, and others; the white-flowered, common, and slender-leaved pæonies. Height 2 ft.
Macleày*a* cordàta, the cordate Macleaya. Height 6 ft. The stems require support in exposed situations.
*C*rámbe marítima and *C.* cordifòlia, the common and the heart-leaved Sea-kale. Height 1 ft. 6 in. and 6 ft. The latter is a noble plant.
Lunària redivìva, the revived Honesty. Height 3 ft.
*Datísca c*annábina, the Hemp-like Datisca. Height 4 ft.
*A*lthæ'a officinàlis, the officinal Marsh Mallow. Height 4 ft.
*G*eranium ibéricum, the Iberian Crane's Bill. Height 1 ft. 6 in.
*D*ictámnus Fraxinélla, the Fraxinella. Height 3 ft.
O'robus nìger, the black Bitter Vetch. Height 3 ft.
O'robus vérnus, the spring Bitter Vetch. Height 1 ft.

*S*piræˋa Arúncus, the Goat's-beard. Height 4 ft.
*L*ỳthrum virgàtum, the twiggy Lythrum. Height 3 ft.
*E*rýngium plànum, the flat-leaved Eryngo. Height 3 ft.
*E*rýngium alpìnum, the alpine Eryngo. Height 2 ft.
*E*rýngium amethýstinum, the amethystine Eryngo. Height 3 ft.
Aràlia racemòsa, the racemose Aralia. Height 4 ft.
*E*chìnops sphærocéphalus, the round-headed Globe Thistle. Height 5 ft.
*E*chìnops *R*ìtro, the Ritro Globe Thistle. Height 3 ft.
A′ster sibíricus, the Siberian Starwort. Height 2 ft.
Solidàgo bícolor, the two-coloured Golden Rod. Requires a stake in exposed situations.
Stenáctis speciòsa, the showy-flowered Stenactis. Height 2 ft.
Solidàgo flexicaúlis, the crook-stalked Golden Rod. Height 2 ft.
I′nula *H*elèn*ium*, the Elecampane. Height 4 ft.
Telèkia cordifòlia, the showy Telekia. Height 4 ft.
Heliánthus multiflòrus, the many-flowered Sunflower. Height 6 ft.
Campánula latifòlia, C. macrántha, C. *T*rachèlium. and C. glomeràta; the broad-leaved, large-flowered, Throatwort, and clustered, Bellflower. Height from 2 ft. to 3 ft. These plants, in exposed situations, require stakes.
*P*hlóx paniculàta, *P*. corymbòsa, and *P*. acuminàta, the panicled-flowered, corymbose-flowered, and pointed-leaved Phlox. Height 3 ft. to 5 ft.; in exposed situations requiring stakes.
*G*enti*àna* lùtea, the yellow Gentian. Height 4 ft. Requires an open airy situation, and a stake if it be much exposed.
*P*hlóx glabérrima, the smoothest Phlox. Height 3 ft.
*S*ýmphytum bohémicum, the Bohemian Comfrey. Height 3 ft.
Scopòli*a* carniólica, the Carniolan Scopolia. Height 1 ft.
*B*etónica grandiflòra, the great-flowered Betony. Height 1 ft. 6 in.
*S*álvia glutinòsa, the glutinous Sage. Height 3 ft.
*L*ysimàchia vulgàris, the common Loose-strife. Height 3 ft.
*L*ysimàchia verticillàta, the whorled Loose-strife. Height 1 ft.
*L*ysimàchia thyrsiflòra, the thyrse-flowered Loose-strife. Height 1½ ft.
*S*tátice latifòlia, the broad-leaved Sea Lavender. Height 1 ft.
*R*ùmex alpìnus, the alpine Dock. Height 4 ft.
*R*hèum palmàtum, the palmated Rhubarb. Height 5 ft.
*R*hèum Emòdi, the Southern Rhubarb. Height 8 ft.
*E*uphórb*ia* hibérnica, the Irish Spurge. Height 1 ft.
*U*rtìca nívea, the snow-white-leaved Nettle. Height 6 ft. Requires a stake in exposed situations.
I′ris sibírica, and *I*. s. flòre álbo, the common and white-flowered Siberian Iris. Height 3 ft. and 2½ feet.
*A*ˋrum *D*racúnculus, the common Dragon Arum. Height 3 ft.
Fúnk*ia* subcordàta, the subcordate-leaved Funkia. Height 1 ft.
Fúnk*ia* ovàta, the ovate-leaved Funkia. Height 1½ ft.
A′llium Victoriàlis, the Victorialis Garlic. Height 2 ft.
*A*spáragus officinàlis, the common Asparagus. Height 4 ft.
*V*eràtrum nìgrum, the dark-flowered Veratrum, or black Hellebore. Height 3 ft.
*V*eràtrum álbum, the white Veratrum, or white Hellebore. Height 5 ft.
Uvulària grandiflòra, the large-flowered Uvularia. Height 1 ft.

Herbaceous Plants with the same Properties, except that the Roots are less compact, though still not creeping.

*S*ìda Napæˋa, the Napæa Sida. Height 4 ft. Requires a stake in exposed situations.
Baptísia austràlis, the Southern Baptisia. Height 2½ ft.
Galèga orientàlis, the Oriental Goat's Rue. Height 4 ft.
Epilòbium angustíssimum, the narrowest-leaved Willow Herb. Height 2 ft.

Astrántia máxima, the greatest Masterwort. Height 2 ft. In very mild winters does not die quite down to the ground.

*P*hyteùma campanuloìdes, the Campanula-like Rampion. Height 1 ft.

Cynánchum Vincetóxicum, the Vincetoxicum Cynanchum. Height 2 ft.

*B*oràgo orientàlis, the Oriental Borage. Height 2 ft. In mild winters does not die quite down.

*A*cánthus móllis, *A*. spinòsus, and *A*. spinosíssimus, the soft, prickly, and most prickly, Bear's-breech. Height 3 ft. In sheltered situations these plants sometimes retain a little foliage through the winter. They are interesting on account of their foliage, which, according to some, gave rise to that of the Corinthian capital; but the adherent petioles of palm leaves are much more likely to have been the original type.

*H*emerocállis flàva and H. fúlva, the yellow and copper-coloured Day Lily. Height 2 ft.

Herbaceous Plants of vigorous Growth and compact Habit, but which do not lose the Whole of their Foliage in Winter.

*A*conìtum Napéllus, the Monk's-hood Aconitum. Height 4 ft.

*P*apàver orientàlis and *P*. bracteàta, the Oriental and bracteate Poppy. Height 3—4 ft. In exposed situations these may require to be staked.

*G*erànium sanguíneum, the bloody Crane's Bill. Height 1 ft.

*G*erànium lívidum, the livid-flowered Crane's Bill. Height 1½ ft.

*G*erànium refléxum, the reflexed-flowered Crane's Bill. Height 1½ ft.

*L*upìnus polyphýllus, the many-leaved Lupine. Height 2 ft.

Astrántia màjor, the greater Masterwort. Height 2 ft.

A'ster *A*méllus, the Amellus Starwort. Height 2 ft.

Agrimònia *E*upatò*ria*, the Eupatoria Agrimony. Height 3 ft.

*P*hlòmis gigantèa and *P*. sàmia, the gigantic and Samian Jerusalem Sage. Height 3 ft.

*L*àmium *Orvàla*, the Orvala, or Balm-leaved, Archangel. Height 1¾ ft.

*B*etónica strícta, the strict Betony. Height 1½ ft.

Melíssa officinàlis, the officinal Balm. Height 1 ft.

Evergreen herbaceous Plants of compact Habit, which will grow on a grassy Surface.

*H*ellèborus fœ'tidus, the fetid Bear's-foot Hellebore. Height 1½ ft.

*H*ellèborus nìger, the black Christmas Rose. Height 1 ft.

*H*ellèborus olýmpicus, the Olympian Hellebore. Height 1 ft.

*M*álva moschàta, the Musk Mallow. Height 2 ft.

*S*axífraga crassifòlia, the thick-leaved Saxifrage. Height 1 ft.

*S*axífraga cordifòlia, the heart-leaved Saxifage. Height 1 ft.

Valeriàna rùbra (Centránthus rùber *Dec.*), the red Valerian; and C. r. flòre álbo, the white-flowering Valerian. Height 1½ ft.

*F*érula commùnis, the common Giant Fennel. Height 10 ft.

*V*erbáscum ferrugíneum, the rust-coloured Mullein. Height 3 ft.

*P*otèrium Sanguisórba, the Sanguisorba Burnet. Height 2 ft.

Ròhde*a* japónica, the Japan Rohdea. Height 2 ft.

I'ris fœtidíssima and *I*. f. variegàta, the common and variegated Gladiolus Iris. Height 1½ ft.

*S*tátice latifòlia and stellulàta, the broad-leaved and the stellulate Sea Lavender. Height 1 ft.

*A*sphódelus lùteus, the yellow Asphodel. Height 3 ft.

Anthéricum Liliástrum and A. Liliàgo, the Liliaster and the Liliago Anthericum. Height 1½ ft. and 1 ft.

Yúcca filamentòsa, the filamentose Adam's Needle. Height 2 ft.

Herbaceous Plants, of bold Growth, which produce many upright Stems ; and, in exposed Situations, will require Stakes from the Middle of June till September or October.

*C*lématis erécta, the upright Virgin's Bower. Height 3 ft.
*C*lématis integrifòlia, the entire-leaved Virgin's Bower. Height 2 ft.
*Th*alíctrum glaúcum, the glaucous-leaved Meadow Rue. Height 5 ft.
*D*elphínium elàtum, the tall Bee Larkspur. Height 6 ft.
*D*elphínium azùreum, the azure Larkspur. Height 6 ft.
*L*ýchnis chalcedónica, the Chalcedonian Lychnis. Height 2 ft.
*S*ída dioíca, the diœcious Sida. Height 6 ft.
Sanguisórba canadénsis, the Canadian great Burnet. Height 3 ft.
Sanguisórba officinàlis, the officinal great Burnet. Height 4 ft.
*L*igústicum Levísticum, the common Lovage. Height 6 ft.
Scabiòsa leucántha, the white-flowered Scabious. Height 3 ft.
Rudbéck*ia* purpùrea, the purple Rudbeckia. Height 5 ft.
*S*ílphium perfoliàtum, the perfoliate Silphium. Height 7 ft.
*S*ílphium laciniàtum, the jagged-leaved Silphium. A splendid plant, which attains the height of 10 or 12 feet on a lawn.
*S*ýmphytum aspérrimum, the roughest Comfrey. Height 6 ft.

Herbaceous Plants with creeping Roots, which will thrive on a grassy Surface, and may therefore be introduced in Burying-Grounds or on Lawns.

Monárd*a* dídyma, the twin, or Oswego Tea, Monarda. Height 3 ft.
Tanacètum vulgàre, the common Tansy. Height 2 ft.
*G*naphàlium margaritàceum, the pearly Everlasting. Height 1½ ft.
*G*àlium *M*ollùgo, the great hedge Bed-straw. Height 2 ft.
Convallària *P*olygónatum, Solomon's Seal. Height 2 ft.
Convallària majàlis, the Lily of the Valley. Height 6 in.
Epilòbium angustifòlium, the narrow-leaved Willow Herb. Height 4 ft.
*E*rýngium campéstre, the field Eryngo. Height 2 ft.
*C*entaurèa montàna, the mountain Centaurea. Height 1½ ft.
*M*yosòtis palústris, the Forget-me-not. Height 6 in.

BULBS.

The genera Eránthis, Galánthus, *C*ròcus, *S*cílla, *H*yacínthu*s*, Erythrònium, *C*ólchicum, and some others of low growth, which flower in early spring or late in autumn, may be planted on graves, or at the base of gravestones, where their foliage, after they have done flowering, will be out of the way of the scythe. The following may be planted singly on a grassy surface.

Adòni*s* vernàlis, the spring-flowering Adonis. Height 9 in.
*L*ílium cándidum, the white Lily. A favourite flower in Catholic countries. Height 3 ft.
*L*ílium. Most of the other species in sheltered situations.
Fritillària imperiàlis, the Crown-Imperial Fritillary. Height 4 ft.
*S*cílla esculénta, the Quamash Squill. Height 1 ft.
*G*ladìolus commùnis, natalénsis, and other species of the Corn Flag. Height 2—4 ft.
Amarýlli*s* formosíssima, the Jacobæa Lily. The lily of Turkish cemeteries, and the badge of the Knights of St. James of Spain.
*N*arcíssus. All the species.
Sternbérg*ia* lùtea, the yellow Sternbergia. Height 6 in. Supposed by Sir J. E. Smith to be the lily alluded to by our Saviour in his sermon on the Mount.
*L*eucòjum æstìvum, the summer Snowflake. Height 1½ ft.

*O*rnithógalum. All the species.
Tùlipa sylvéstris, the wild Tulip. Height 1 ft.

FERNS.

Struthiópteris germánica, the German Struthiopteris. Height 2 ft.
Struthiópteris pennsylvánica, the Pennsylvanian Struthiopteris. Height 2 ft.
Osmúnd*a* regàlis, the royal Osmunda. Height 2 ft.
*P*tèris aquilìna, the common Brake. The badge of the clan Robertson. Height 3—4 ft.
*A*splènium *F*ìlix más, and *A*. *F*ìlix fœ'mina, the male and female Fern. Height 2—3 ft.
Aspídium aculeàtum, A. lobàtum, and A. rígidum; the common prickly, the lobed-leaved, and the rigid Shield Fern. Height 6 in. to 2 ft.

PLANTS USED AS BADGES.

Plants which form national Badges.

Countries.	*Names of Plants.*
England.	The Rose, *R*òsa sp.
Scotland.	The Thistle, *C*nìcus lanceolàtus.
Ireland.	The Shamrock, *O'*xalis Acetosélla *L.*, according to Mr. Bicheno; but commonly considered to be the white clover, *T*rifòlium rèpens *L.*
France.	The Fleur-de-lis, *I'*ris sp.

List of Plants which form the Badges of the Highland Clans.

These plants, many of which are trees or shrubs, are frequently planted over graves by Highland families settled abroad; they are also occasionally planted in gardens both abroad and at home, and in some cases they are sculptured on tombs. Our authority for the following list is *Blackwood's Magazine*, vol. xii. p. 271.

Names of the Clans.	*Names of the Plants used as Badges.*
Buchanan.	*B*étula álba *L.*, the common Birch.
Cameron.	Quércus pedunculàta *W.* (*Q. R*òbur *L.*), the common British Oak.
Campbell.	*M*yrìca *Gàle* L., the Sweet Gale, or Dutch Myrtle.
Chisholm.	*A'*lnus glutinòsa, the Alder.
Colquhoun.	*C*órylus *A*vellàna *L.*, the common Hazel.
Cumming.	*S*àlix càprea *L.*, the great round-leaved Sallow ; or any other native species.
Drummond.	*I'*lex *A*quifòlium *L.*, the common Holly.
Farquharson.	Digitàlis purpùrea *L.*, the purple Foxglove.
Ferguson.	*P*ópulus álba *L.*, the great white Poplar, or Abele.
Forbes.	*C*ýtisus *s*copàrius *L.*, the common Broom.
Frazer.	*T*áxus baccàta *L.*, the Yew.
Gordon.	*H*édera *H*èlix *L.*, the common Ivy.
Graham.	*D*áphne Laurèola, Spurge Laurel.
Grant.	*V*accínium Oxycóccus *L.*, the Marsh Whortleberry, or Cranberry.
Gunn.	Rhodìola *r*òsea *L.*, the Rose Root.
Lamont.	*P*ỳrus *M*àlus *L.*, the Crab-Apple Tree.
Macalister.	*E*rìca cinèrea *L.*, the fine-leaved Heath.
Macdonald.	*E*rìca *T*étralix *L.*, the cross-leaved Heath.

Macdonell.	Callùna vulgàris *Salisb.*, the common Ling.
M'Dougall.	*C*upréssus sempervìrens *L.*, the Cypress.
Macfarlane.	*R*ùbus Chamæmòrus *L.*, the Cloudberry.
M'Gregor.	*P*ìnus sylvéstris *L.*, the Scotch Pine.
Macintosh.	*B*úxus sempervìrens *L.*, the common Box Tree.
M'Kenzie.	*L*ìchen rangiferìnus *L.*, the Reindeer Lichen.
M'Kinnon.	*H*ypéricum púlchrum, St. John's Wort.
McLachlan.	*P*ỳrus aucupària *Gært.*, the Quicken Tree, Mountain Ash, or Rowan Tree.
McLean.	*É*mpetrum nìgrum *L.*, the black Crowberry, or Crakeberry.
Macleod.	*V*accínium *V*ìtis idæ̀a *L.*, the red Whortleberry, or Cowberry.
Macnab.	*R*ùbus saxátilis, Roebuck-berry.
M'Neill.	*F*ùcus vesiculòsus, the Sea Ware.
Macpherson.	*B*úxus sempervìrens variegàta *L.*, the variegated Box Tree.
M'Quarrie.	*P*rùnus spinòsa *L.*, the Black Thorn.
Macrae.	Lycopòdium alpìnum *L.*, the Savin-leaved Club Moss.
M'Ray.	*S*círpus lacústris *L.*, the Bulrush.
Menzies.	*F*ráxinus excélsa *L.*, the Ash.
Munro.	Eagle's Feathers; or, according to the *Vestiarium Scoticum*, the Juniper.
Murray.	*J*uníperus commùnis *L.*, the common Juniper.
Ogilvie.	*C*ratæ̀gus *O*xyacántha *L.*, the Hawthorn.
Oliphant.	*À*cer campéstre, common Maple.
Robertson.	*P*tèris aquilìna *L.*, the common Brake.
Rose.	*R*òsa canìna *L.*, the Briar Rose.
Ross.	*Á*rbutus alpìna *L.*, the black Bearberry.
Sinclair.	Lycopòdium clavàtum, common Club Moss.
Stewart.	*C*nìcus lanceolatus, Spear Plume-thistle.
Sutherland.	*P*hlèum praténse *L.*, the Cat's-tail Grass, or Timothy Grass.

SUPPLEMENTARY ENGRAVINGS.

This lodge (*fig.* 112.) is referred to in p. 155. We consider it as peculiarly appropriate for a cemetery, on account of its church-like towers; one of which is used as a belfry, and the other contains a clock. The design is by John Dobson, Esq., of Newcastle upon Tyne, the contributor of several beautiful cottage villas to the *Supplement* to our *Encyclopædia of Cottage Architecture.*

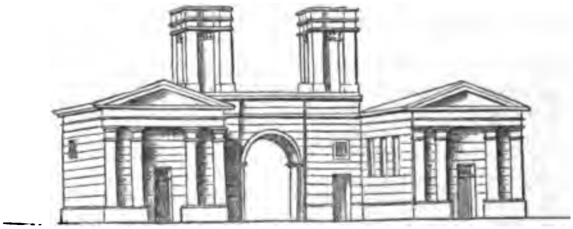

Fig. 112. *Entrance Lodge to the Newcastle Cemetery.*

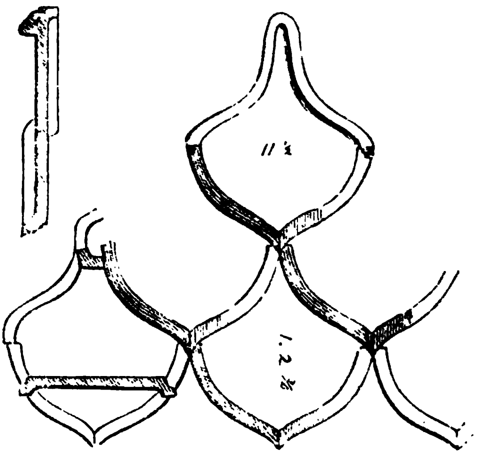

Fig. 113. *Roofing Tiles used in the Cambridge Cemetery Chapel.*

The tiles represented in *fig.* 113. are the invention of Mr. Reed, tile-maker, at Bishop Stortford, and have only lately come into use. They are formed and put together exactly on the same principle as the new French roofing tiles, described and figured in the *Supplement* to the *Encyclopædia of Cottage Architecture*, p. 1260.; and, like them, they are completely weather-tight, even when used with little or no cement. They are the handsomest English tiles that we know of, and peculiarly suitable for ornamental cottages, lodges, &c., in the old English style.

APPENDIX.

Before publishing the preceding sheets, we sent a copy of them to a much esteemed correspondent at Leeds, Thomas Wilson, Esq., in whose taste and judgement we have the greatest confidence, and the following are his criticisms and suggestions. We have preferred giving them in his own words, although we are aware they were written rather as hints for ourselves, than with the expectation that they would be published in the form in which they were sent us.

There is nothing that is so little creditable to the national taste as the mode of conducting funerals. It is easy to account for it however. We are a trade-ridden people; and allow, from habit and indolence, tailors to be judges of taste in our dress, and milliners in that of ladies; and yet, in the present state of education in this country, how is it possible that the former, at any rate, should have the knowledge and the cultivation necessary to qualify them to judge in such matters? So with our undertakers: except in the metropolis, they are men of very limited cultivation; and, besides, the subject is one on which people are so sensitive, in those cases where they are individually concerned as directors of funerals, that no man likes to go out of the beaten path; and we remain, therefore, with parcels and patches of ceremonies and costumes as unsuitable to that which is associated with them, as bag wigs and court dresses with our ordinary attire. The reform in this, as in all other cases, must come out of the people themselves, when they are more enlightened; and especially when they are trained to comprehend the nature of their own minds, and to reason logically, instead of being governed by conventional practices; and particularly when correct principles of taste are established and acted upon, and deduced from the nature of things and from optical principles, and not regarded as a peculiar subject to be comprehended only by a few gifted individuals. I incline to believe that they are susceptible of mathematical demonstration, within limits nearly as rigid as any other branch of human enquiry.

Page 103. "*The ancients contemplated death without terror,*" &c. I do not at all agree with the writer quoted, as to the feelings of the ancients respecting death; but I have not time to seek for instances to support my views. I would, however, just allude to their constant and guarded avoidance of the term death, by the use of the euphemismi, sleep, or repose, fallen asleep, departed, &c.

P. 104. "*The influence of cemeteries and churchyards in improving the taste,*" &c. I should rather consider the cemetery as the result of the taste of the community, than the cause of it; and I think, on reflection, you will admit that your suggestions, as to making it a place of instruction, are only applicable to the transition state of society in which we live.

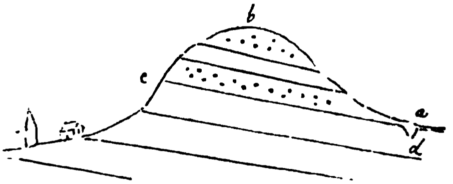

Fig. 114. *Geological Diagram, showing the Strata in which Interments may be made, without injuring the Springs and Wells.*

P. 142. The "*situation*" should not be fixed on without reference to the geology of the country; for instance, if all risk of injury to springs is to be avoided, it should be placed somewhere between *a*, *b*, and *c*, in *fig.* 114.; and drains should be made, as at *a d*, to prevent any moisture from the porous strata descending lower, and there should be no habitations on these strata.

P. 143. line 9. from the bottom. "*One main road, so as to allow of a hearse,*" &c. I should prefer an arrangement like the following. Let the entrance to the chapel be under an extensive portico, which would admit of the whole procession being under cover: here the coffin should be taken out, and the hearse admitted no farther. If the grave be at a distance from the chapel, a somewhat low bier on wheels might be provided, which would move without much exertion on flagged or macadamised roads. *Fig.* 115. is a rough sketch of the way in which I would arrange a cemetery chapel, and conduct the procession. The porch would be a protection to the whole train in wet weather. Let the procession enter at *d*, and the hearse proceed to *a*, the first carriage stopping at *b*. When the coffin arrived at *c*, the mourners would enter from *g*; and they would thus be spared all risk of seeing or hearing the arrangements attendant on removing so heavy a weight as a coffin, which often cause alarm lest any accident should occur, and which, however carefully managed, are so trying to the feelings of those whose thoughts should not be rudely disturbed. By rollers fixed in the floor of the hearse, the coffin might be more easily withdrawn, and placed on a frame so contrived that the bearers might take their places, while the coffin was suspended shoulder height. After the service, it might proceed, without turning, through *h*.

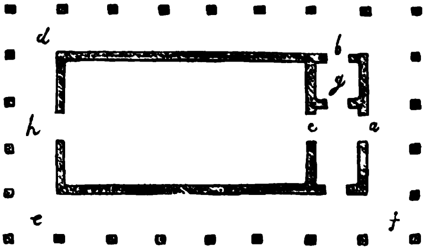

Fig. 115. *Plan for a Cemetery Chapel.*

P. 146. line 4. "*Requires no mapping.*" How am I to find any person's grave, if there is not a plan of the cemetery kept? If the friends of the deceased know it, how are his grandchildren to discover it?

P. 147. last paragraph. "*A mason's yard, with the sheds,*" &c. By no means admit workshops within the cemetery at any rate; nor a mason's or statuary's within hearing. There should be no sound of tools, giving " dreadful note of preparation," to disturb the silence of the place.

P. 153. " *Entrance Lodge to the Tower Hamlets Cemetery*," &c. In fig. 29. *a*, the substitution of folding doors for one swing door would be a great improvement; as it is now, you must shut yourself into the vestibule *b*, before you can see the door leading to *c*.

P. 162. " *The Grave-Box*," &c. Why should not the grave-boxes be constructed, like contractor's waggons, to tilt up; and, like them, be placed on wheels?

P. 217. " *Sixthly*, . . . *and therefore we would render it expensive*," &c. Upon reflection, I think you will allow that we ought not to do that indirectly, which public opinion will not support us in doing directly. If a practice be admitted to be wrong, then prohibit it altogether. To check it by taxing it is tyranny: it is admitting passion, and not reason, into legislation; and it is also false, on the same principles as the old sumptuary laws are admitted to be wrong. Let acts of parliament stop outside the grave: all on this side of it, in this act of parliament nation, is governed by statute. No sooner, in these days, does a kind and benevolent spirit detect a hardship or a wrong, than it flies to parliament for a remedy; forgetting that, if we are to deal with effects, we must have millions of laws; but, if we deal with causes, very few will suffice, and those few will soon be superfluous.

" *Interments in catacombs or vaults*." With respect to interments in vaults or catacombs, as they will probably be continued, it is worth while considering whether there should not be provided some outlet for the gas, by a drain running at the back, and communicating with a chimney in which a current of warm air would aid the draught, or with a chamber in which it might be absorbed or decomposed. In *fig*. 116., *a a* are catacombs; *b b*, channels communicating with a drain *c*; *d*, a chimney or chamber, in which there may be a fire for rarefying the air and creating a draught.

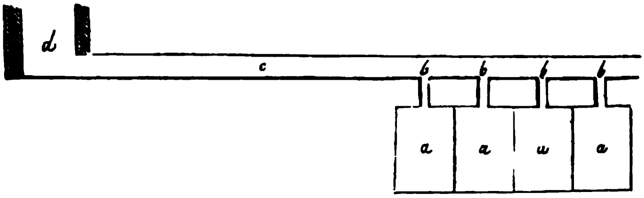

Fig. 116. *Diagram showing how the Mephitic Gas may be collected and carried off from Catacombs.*

" *Seventhly*. . . . *We would allow individual taste*," &c. There should be a veto somewhere, to exclude inscriptions improper, inaccurate, or ludicrous.

" *Monuments*." It appears not to come within the scope of your work to give designs for monuments; and, perhaps, it would render it more costly than you purpose; but, if this work should, as I feel sure it ought and must, attract great attention, you might follow it up by a dissertation on the style of monuments, with examples. Such a manual would be a great boon to many a wounded spirit, that has now no other means of satisfying its desire to perpetuate some beloved object, than by consulting some rude village or town marble-mason, whose business-like ideas and technical expressions are in sad contrast with the thoughts of his employer.

P. 221. " *Order Book*." If this work is to be a manual, at least for directors of cemeteries, if not for the managers, it might be useful, in the Appendix, to give the best forms of these books. Most of the books so used are susceptible of great improvement. If the present modes were thus made public, you might, through the *Gardener's Magazine*, from time to time, receive and record various suggestions for their improvement.

" *Register Book*." I have expressed an opinion that the books in use might be improved; and, as an instance, I offer the following arrangement as much superior to the one you have given, because grouping together facts that are of the same kind or time. I have not considered whether it contains all that is desirable; I merely take it as it is, and rearrange it thus. No. of interment; name, description, and residence of the deceased; age; disease (this will, however, be of no value unless it be certified by a medical man); date and hour of burial; officiating clergyman; sexton; undertaker: all these relate to the past. The following refer to the future: No. of grave; in what part of cemetery; monumental distinction, purchaser, and date; amount for interment; sum paid for keeping in order the grave, &c., and time during which, &c.

P. 222. "*Ledger.*" I think there ought to be a corresponding ledger, showing what duties are to be performed towards each grave, in double form. First, classed numerically. No. 1. Stone to be kept in order for ten years; date at which the liability commences and ceases. No. 5. Flowers to be planted, &c. &c.

Again, in another form. Gravestones to be kept in order: Nos. 7. 12., &c., &c. Flowers to be planted: Nos. 5. 9. 13., &c. &c. Or, perhaps, the same end might be obtained by having a map with a distinctive colour for each kind of duty, so that the attendants and managers might see at a glance that the whole was correctly performed.

"*Map Book.*" The scales adopted should be uniform, and should be some multiple of the scale used in the township plan or government survey.

"*Rules and regulations,*" &c. If you propose to make your work a manual, then add a code of these rules, compiled from the best existing codes, with additions. Perhaps these details might accompany the collection of monuments which I before suggested.

P. 298. "*Temporary cemeteries,*" &c. The best purpose to apply what you have designated temporary cemeteries to, would be to plant them and keep them in timber, and so insure that the ground need not be disturbed, at any rate not to a depth that would interfere with the interments.

P. 299. "*Shillibeer's hearse*" was introduced here [Leeds] a few weeks since, and struck me as a great boon to those who wish to reduce the cost of funerals, and yet fear to do what may be considered not respectful towards the deceased. I cannot say whether it has been much used or not, but I have no doubt of its soon being employed when it is fully known.

"*Mr. Jukes's truck-hearse*" would, I suppose, answer within the cemetery, as I have already suggested. I should think it is susceptible of very great improvement. The retarding ought to be effected by some mode more consistent with the solemnity required.

P. 300. "*Funeral processions,*" &c. I wish you had enlarged more on the subject of funeral processions and attendants. It would be improper to treat the subject with levity; but it may be safely asserted that the whole of the arrangements are suitable only to a barbarous age. The dresses and decorations are even childish, and many of the accompaniments any thing but appropriate. The heavy and ponderous ornaments are intended to convey an idea at once of solemnity and magnificence; but how badly are they supported by the appearance of the jaded and foundered horses, and the uncouthness of the drivers! This is a part of the subject that I hope you will take up, and illustrate it by drawings contrasting the present modes with others more consistent with good taste. It is in vain, at present and at once, to advise the middle classes to retrench in these expenses; but it may be possible to persuade them to adopt more rational modes of proceeding.

P. 354. "*The soil of the Cambridge Cemetery,*" &c. I think borings should have been taken, to the depth of 10 or 12 feet at the least, and the result stated, as well as the direction of the dip, if any, of the strata.

P. 358. line 5. "*Steps to the chapel,*" &c. I should object to a flight of steps, even at the risk of injuring the appearance of the building, as unsuitable to the purpose and inconvenient to those who carry the body; if it must be elevated, let the ground rise gently: but, if you will have steps, let them be not less than 7 ft. broad, that the bearers may have room to stand at each rise.

P. 401. line 15. " *No evil results,*" &c. That is, of course, no appreciable evil; but I incline to think that the gas will still escape, and, though in small quantities, be injurious: now, could not some substance be found, that might be placed round the coffin, which, having a greater affinity for some of the elements of the gas than the other elements have, would decompose it, and render it innocuous? The next consideration is, at what expense could this be done? I need not say this is a very different matter from putting lime *into* the coffin (p. 297.); the object here is not to decompose, but, when the products of decomposition are formed, to render them harmless. As to expense, I believe that is, in all cases, only a question of time. I mean that, if we can once accomplish an object at any cost, we shall ultimately, by some means or other, do it economically. Expense depends on modes, not on principles, in these matters.

P. 401. " *Graves as deep as wells,*" except that the cost would soon be such as to defeat the object. This object might be attained where there had been quarries excavated, by filling the ground up gradually; but this would also be an expensive process.

P. 405. line 14. from bottom. " *Mnemata, or the tombs.*" Is it not the Greek word *μνηματα*? and, if so, it means recollections, remembrances, memories; and forms a beautiful instance of their euphemismi, as applied to the tomb.

P. 480. " *The practice of admitting cattle into churchyards*" has arisen out of an abuse of the law. When a church was founded, as almost all our churches were, by the great landowners of the time for the use of their tenants, a churchyard was added for interment. By legal construction, the incumbent is considered as a corporation sole, and the freehold vested in him to preserve it for the uses of the church; but he has gradually come to look upon it as if it were as much his, for any purposes, as any other freehold, subject only to the limit of the right of interments. Hence his claim (which is good in law but not in justice, nor consonant to the feelings of these times,) to stock it as well as any part of the glebe. It ought not to require an enactment to remove this encroachment: the bishops or archdeacons have only to discourage it; and the public has only to direct attention quietly and generally, but not offensively and personally, to it, and it will be prohibited. It is quite clear that this practice must be discontinued, before any useful attempt can be made to beautify our churchyards.

P. 481. line 32. " *The enlargement of churchyards*" should be provided for by forming them at first, or on their first alteration, so as to admit of additions at the least cost It would seem to be the best way, to provide for the addition on one side, and that the narrowest, so as to destroy the shortest possible length of fence. To enable this to be done, building within certain limits of a churchyard should be prohibited, and a power given to certain persons to take land for the purpose.—*T. W. Crimbles House, March* 24. 1843.

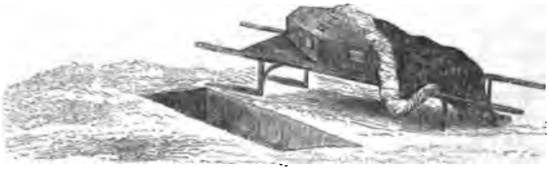

Fig. 117. *Hand-bier referred to in* p. 300.

ART. III. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 497.)

LETTER XX. *The Crane or Goose-necked Hoes: Objections to them answered. Músa Cavendíshii, M. Dácca, and M. sapiéntum.*

THE objection you think likely to be made against the crane or goose-necked hoes, that the workman is obliged to stoop, and take one in each hand, is the very same the West-country man makes to the spade used in every other part of the kingdom I have seen. It is no trouble to a workman with a good eye-handled spade to work double with them; and with much better effect, too, than he could with one long-handled, ugly-shaped spade. I am glad you noticed them in Devonshire, and the manner of using them. The work done with these hoes is evidently far superior to that executed with any thing in the shape of a long-handled two- or one-handed hoe, amongst small crops requiring to be hoed and thinned out with the greatest regularity; and for this reason, that the workman has both his eyes and his strength close to his work, and his hands to make short quick strokes; and, when tired of using both hands at once, he can change about, hoe right and left, resting one hand alternately on his knee, by which means one side is getting rest, whilst the other side is working. Every man, when young, should learn to use, not only the spade and the hoe right and left, backwards and forwards, but also every other tool that he employs. He would not only find great ease from such a practice, but would not be so liable to have different complaints and diseases settle on him, besides getting more work done in a superior manner. Is it natural for us to throw our whole strength on one side more than another, to impose more on one eye, or on one limb, than another? I am aware that great prejudice has existed against using the above hoes in gardens. I believe they are not well calculated for fat or gouty people; but I often fancy it would be good for their health, if they could only be persuaded to make use of them of a morning for three hours before breakfast. I have used them many times sixteen hours a day in a London market-garden, and with interest too. I am often sorry to see men, in this enlightened country, make use of tools in a very awkward back-handed way, for the want of being shown how to use them better; and many masters, from want of practice themselves, do not know how to show their men the proper way to take hold of a tool, nor at which end of the job to begin.

Agreeably to your wish, I take the present opportunity of informing you respecting the fruit of the Mùsa Cavendíshii, which you tasted when here. I gathered the eleven last of the fruit on December 2.; making in all 427 ripe and perfect fruit gathered off the same plant. I am pleased to say one of the Mùsa Dácca is showing fruit, very fine; it was only a small sucker planted out last March. The M. sapiéntum, planted on the same day, has its leaves at this time doubled against the top of the house; and the trunk, which, when I measured it for you, was 14 ft. 6 in. high, and the base of the stem 3 ft. 3 in. in circumference, is now more than 16 ft. high, and the trunk 3 ft. 7 in. in circumference at the base, although I have kept them cold and short of water now for some time.

Bicton Gardens, Dec. 12. 1842.

LETTER XXI. *System of Kitchen-Gardening continued. Culture of the Cabbage, Broccoli, Pea, Bean, Onion, Carrot, Parsnep, and Spinach.*

THE most useful of all vegetables is the *Cabbage*, both for man and beast; and every person who has a little bit of garden ground attempts to grow and cultivate it, or some of the numerous family of *Brássica*. It is to be seen in every garden, whether large or small, during some part of the season; and almost every town and village has its own peculiar sort: but some of them are not worth cultivating, although they will tell you they will do for the cows and pigs; yet cows and pigs like a good cabbage as well as we do, and it is no more expensive to cultivate a good one than a bad one. Cabbages will grow on any good ground; but, like every thing else, are fond of good manure, and of ground well prepared and sweetened. I believe I have grown every new sort I have ever heard of; and up to this time I find none to excel the Matchless, the Nonpareil, and East Ham Cabbage, for quickness, beauty, and good flavour, growing close to the ground, and having no waste loose leaves to encumber them. *The true Nonpareil* will come in the quickest by fifteen or twenty days. *The East Ham* is the largest. *The Matchless* is the smallest, and of a very fine dark green colour for cooking as coleworts and greens, and is either the same, or very much like what I used to see grown in the first-rate market-gardens about London for years. The three above-named cabbages, true to name and sort, will give satisfaction to every grower, if a good preparation be made for them. They are quite distinct, and I think I should easily know them from each other wherever I might see them growing.

They cultivate the worst sorts of cabbages in Devonshire I ever saw. I recollect well, on first entering Bicton kitchen-gardens, I saw a large piece of something planted out cabbage-fashion. I asked the foreman what it was, and he told me it was the spring cabbages, and that they were the best sort in England, the Paignton and early Cornish. I told him I never before saw such wild, long-leafed, long-legged plants, to be called cabbages, and be said to be fine when they came in. However, I had a pinch of East Ham with me, of my own saving; I sowed a little in a pan or two in the January following, pricked them early, and got them good plants by the first week in March. I then planted them out; and had pretty cabbages from them, five weeks sooner than from those ugly-looking ones that had been hoed every dry day, and nursed and taken every possible care of all through winter. Scarcely any of these were fit to cut before we had peas and beans; how, then, could they be called spring cabbages? I like to see pretty cabbages in March, April, and May, and that is the time they are looked for; I have always found it so, and not when other vegetables are plentiful. As soon as possible I trenched them all in for something else to grow on; never meaning to cultivate, myself, any more of those wild sorts, whilst I know of better ones to be grown at the same cost: but no doubt it would require much persuasion to convince some of the West-country men that there are any better sorts than they have been accustomed to cultivate.

I generally sow the seed for my early cabbages about the 25th of July; prick them early at 3 in. apart each way; then again at 6 in., which makes them strong and short-legged. It is my usual practice to grow them on the piece of ground the onions have been raised in. As soon as possible after these have been cleared off, the ground is well dunged and trenched, and laid up in ridges, as rough as possible; and at about every 12 or 14 feet a sloping bank is cast up, by throwing two trenches into one, which breaks the cold winds from the cabbages, and supplies fine places for winter endive, brown Cos lettuce, cabbage lettuce, cauliflower, late cabbage plants for spring planting, and many other things; lying dry and healthy, and, when carefully done, having a very neat appearance. Of course, I sow about once a month all summer and spring for coleworts. I generally make it a rule to prick my spring cabbage plants on my cucumber ridge, which was the case this season; the ridge being 100 ft. in length, and when forked down about 8 ft. wide, all of good fresh earth from the frames, and waste soil from the potting-shed, which I always save; and I will warrant that not one handful of it had been near where a cabbage had been grown. Six kinds of cabbages were pricked; the principal part of them were the three I have before mentioned, and the rest three new sorts for proving. However, to my great disappointment, after making every necessary preparation for their being planted out permanently, I found some of the sorts nearly all clubbed and tuberous-rooted; of the Matchless eight out of ten were in this state. I must observe, that I am as fond of preparing for and planting out a cabbage, as I am of tending the most beautiful or rarest plant in the hothouse or greenhouse; and I always make it a rule to have a hand in it myself.

I have heard many remarks made on the cause of the *clubbing* of plants, and many pretended cures for it; but I have not yet heard or seen any that have been satisfactory to myself. I have watched the disease in its various forms for many seasons, and thought much concerning it; and I have at last formed my own simple opinion as to its cause: but my view is not yet sufficiently matured for publicity. One thing is my firm belief, and that is, that neither the club root nor tuberous root is caused by any insect whatever; but that, after it is formed, it becomes a harbour for all kinds of insects.

There is another disease, *the worts,* to which the roots and stems of cabbage plants are subject. These are caused by a small thick, short, white maggot; and I have seen these worts so close together, and swelled so large, that people called them club root, though entirely distinct.

There is, in the summer, another enemy to cabbage plants, in the shape of a small white maggot, rather longish, which attacks them under ground in such numbers that they entirely eat off all the roots, and bark the stems. A hot day comes, and down the plants all drop. This enemy is well known amongst cauliflowers in the summer months, and amongst all the broccoli tribe, &c. The only remedy I ever could find to stop it in time is soot-water, poured round the stems from the spout of a watering-pot: but it is of no use doing it after the enemy has stripped the stem. There is still another destructive grub, generally very numerous after a dry summer: a large brown grub, 1 in. or 1½ in. in length, that eats off the plant about 1½ in. below the ground; hides generally within 3 in. of the plant, and is easily detected by stirring the earth. The plant is otherwise subject to many kinds of vermin above ground, such as the black dolphin and many varieties of aphis, and caterpillars, slugs, and snails. The two last-mentioned need not be suffered long, except by slothful people; for cleanliness and continually hoeing and stirring the ground will soon disagree with them. That is the only method to keep all away, except the caterpillar; and to destroy these I know of no better means than picking them off and killing them.

I believe there is many a practical man who has never observed the difference between the club, the tuberous, and the worted rooted diseases, but has set it down in his own mind, that they are one and the same disease, caused by an insect.

Every practical man must have observed amongst his broccoli, here and there, one that never headed further than cabbaging, showing at once what broccoli originated in. It is also plain that the Brussels sprouts originated in the Savoy; and I am not sure that it will not prove that the turnip originated in the cabbage, or the cabbage in the turnip: one thing I am certain of, that the cabbage is to be found with both tuberous roots and bulbous roots; and the Swede turnip is to be found fibrous-rooted like the cabbage, or more in the way of rape. All these observations I have often made, and I mean to watch them still more closely.

I make it a rule to have two sowings always of the *Winter Broccoli*, the first about the middle of April, and the second about the middle of May. I prick the plants early, get them strong, and plant them between the crops of peas, one row on each side of a row of peas, which shades them for a time, and as the peas are pulled away from them, the ground is forked, &c. They soon get strength, and grow away.

I always take care to have all ground trenched well in winter for *Peas*, and well manured, except for the first crop, which I find comes in quicker by being sown on the ground whilst it is rather poor. Stopping them just as they begin to come into bloom causes them to set all together and quickly. I take care to have the second crop to follow immediately. I have grown almost every sort of peas that I ever heard of up to the present time; and I find that for the first crop there is no kind better than the *Warwick*, which I sow at the bottom of sloping banks the first week in December; and find that by so doing they are just ready to come through the ground about Christmas, about the time frost sets in. If they make their appearance above ground, and the frost does come, I take care to cover them with dry dusty soil of any kind, which I always have in readiness: it keeps them healthy, and free from canker and shanking off. For succession I sow the *Frame* pea, and a few *Charlton;* and for general summer crops the *Scimitar Blue, New Green Marrow, Milford's Marrow,* which is a fine pea, and *Knight's Tall Marrow,* the best-flavoured and most useful of all peas. All the last-mentioned sorts cannot have the ground too well trenched, manured, and prepared; particularly Knight's tall marrow, which will not do on poor ground. I have had them 16 ft. high, kept up with poles and ropes. Sow or plant the seed 3 in. apart. They always grow up very weak, and continue so for some time; but as the season advances they gain strength wonderfully, and branch out, if stopped when 2 ft. high. If you take care to stop them again when about 4 or 5 feet high, and once or twice afterwards, according to their strength, you will cause them to be from 3 ft. to 4 ft. in thickness in the row. If they show bloom before I am likely to want them, I pick all off for a time. I reckon on them to serve the table every day all through the driest and hottest part of the summer, from July to September; and I have had most wonderful crops from them, when treated in the above manner. I have never heard a single person say but that they were the best-flavoured of all peas. It is of no use to think of having a fine lasting crop of peas, if there is not a thoroughly good preparation made for them. If a good preparation be made for them, and the ground fresh, that pest the mildew will not trouble much, for it is nothing but drought and poverty that causes the mildew in late crops.

Beans, every practical man knows, like a good holding loam, and can be much forwarded, as well as peas, by being sown in pans, in frames, vineries, peach-houses, &c., and then planted out in a warm border or on the sides of ridges or sloping banks. The best early bean I am acquainted with is the *Mazagan*, to be succeeded by the *Wonder Long Pod* and *Windsor Broad Bean.* Cutting off every alternate row, just as they are coming into bloom, which rows should not be planted nearer than 3 ft. apart at first, makes a very great improvement in the crop left; and those that are cut down break out again and make a good successional crop. The black dolphin is the worst enemy I know of amongst beans, and attacks them about the time they come into bloom. It is easily got rid of with a garden engine and soap-suds, which will clear every living one off; but, if not well attended to, oftentimes the crop is much injured by this pest.

The Onion is one of the most wholesome and useful of all vegetables. It also requires the ground to be well trenched, laid in rough ridges all the winter, and forked and tumbled over as roughly as possible every frosty morning with a strong fork or pick, which sweetens it and kills all vermin. Sow in drills 1 ft. apart, and not until the ground is thoroughly pulverised; choosing a fine day to level down, any time between the 1st and 20th of March; and even then, if your ground is not in thoroughly good condition, defer it for another week: but you need not sow them on Valentine's day, because you heard your grandfather say that he had always done so, let the wind blow whichever way it might. No better sorts of onions do I know of for general purposes throughout the year, than the *Deptford*, *Reading*, *New White Globe*, and *Old Brown Globe*, or *James's keeping*. The *Two-bladed* is a beautiful onion for putting in the earliest in the spring; but it is not much known except in the London market-gardens. The *Silver-skinned* is the best for pickling. Sow the seeds in the drills with manure, charcoal-dust, bone-dust, or well-pulverised night-soil, which are all fine manures for growing crops of onions. Take care to run the

Dutch hoe up between the drills as soon as the onions can be seen; and the small hand goose-necked hoes, one in each hand, as soon as the whip (as it is termed in a market-garden) is clear out of the ground. Every practical man must know that an onion comes out of the ground doubled like a whip and handle. A good small-hoer, in the neighbourhood of London, is certain of finding plenty of employment, and, as the work is let by measurement, he has the opportunity of earning high wages; but it is astonishing what mischief a bad workman makes amongst crops by muddling and trampling about. I have known five pounds an acre given for hoeing the onions during the season, that is, for three times; but it is now done for much less, and I have seen many men attempt to hoe with a hoe in each hand, that could never learn to use it properly with one.

The Carrot is a very useful vegetable, and much sought for in every family almost every day in the year, and is a very useful hearty food for cattle. I am only surprised that more are not grown by farmers for the cattle. The ground about this neighbourhood is the finest for carrot-growing I ever met with, a beautiful sandy loam; and I have this season grown a greater weight of the straightest well-coloured carrots, than ever I saw in Surrey, Kent, Essex, or Middlesex. I have sometimes talked to the farmers in this neighbourhood about growing carrots, and the answer I have always got is, that they are sure they would never answer hereabouts; but I could never discover that any had tried it. They crop with so and so during the spring, because their grandfather had done it before them, fifty years ago, and then find out in some way when it is harvest time; but complain wonderfully because the land has only brought from fifteen to twenty-five bushels per acre. The very same land, in my humble opinion, under the present improved method of cultivation in some neighbourhoods that I have seen, would yield double the above quantity. To grow carrots they must not scuffle over the land as they now do, or they will not get them much longer than my thumb; but they must let the subsoil plough go to work; when for several seasons the crops that followed would be much benefited by the change, and by the soil being broken deeper than it ever had been before. I cannot understand why some of the men do not try to break their ground deeper. When in conversation with any of them about it, they always acknowledge it would be better for every thing; but still they have not the resolution to put it into force on ever so small a scale. The only excuse I ever heard is, that the rents, rates, &c., are so high they cannot manage it; and my argument is, that that would be the way to get something to pay them with. The best sort of carrot for colour, length, and general crop is the *Surrey;* and the *Horn* for framing and all early purposes. Never sow them till the latter end of March or beginning of April, for a general crop, and sow in drills 1 ft. apart; and hoe in the same sort of way as for the onions, taking them in time as soon as seen above ground.

Parsneps will grow good with the above management, but like a richer and heavier soil, and should be sown in drills.

Spinach I always sow in drills the same distance, making a good preparation, and sowing the principal winter crop about the 12th of August; indeed, I sow every thing in drills.

Lettuce all the summer months I sow in drills, and thin and hoe out, as they are so apt to get checked when planted out in hot weather, and to run to seed; but sowing in drills, with constant hoeing, keeps them growing healthily.

I think I shall not dwell longer at present on kitchen-gardening, but give you an occasional letter on any subject that I may hereafter consider useful. To sum up all in a few words, trench the ground and throw it into rough ridges immediately after any crop is done with; choose good and proper seasons for every crop, that is, the right season for putting it into the ground. Hoe and fork the ground at every opportunity; but never get trampling on it when in a very wet state, or it will soon become soured and unkind. By following the above method you will never be troubled much with slugs, snails, or any other sort of vermin, but have all vegetables sweet, clean, and wholesome.

Bicton Gardens, Nov. 30. 1842.

[In answer to several enquirers, we beg to state that Mr. Barnes's mode of pine-growing will be given in the December or January Number, we are not certain which. A gardener, who writes to us on this subject, says that he was at Bicton on the 8th of September, and saw queen pine-apples which numbered sixteen pips in depth!! He fully corroborates all Mr. Cruickshank says (p. 547.) as to the vigour of the greenhouse and hothouse plants; and he mentions a musa sucker, which had grown 33 ft. high between January and June last.]

ART. IV. *Notice of a Visit to Bicton Gardens in August* 1843, *with Remarks on the Culture practised there, and on the State of some of the Plants.* By JAMES CRUICKSHANK, Gardener to the Right Honourable the Earl of Lonsdale, at Lowther Castle.

THROUGH the kind permission of my present employer, the Earl of Lonsdale, I have lately visited Bicton Gardens, so fully described by yourself last season (see our Vol. for 1842, p. 552.), and by the original but straightforward letters of Mr. Barnes, the gardener there.

I must confess his description of the plants, and his mode of treating them, seemed to some of us in the North not a little marvellous; or, at least, we put them down, as we do some of the advertisements of dahlias, as not to be depended on: but, having seen the gardens and plants at Bicton, I am bound to state, in justice to Mr. Barnes, that I never was so surprised and pleased in my life. There are not many places that a gardener can visit but what he may find fault with, or have reason to do so on careful examination; but I must say I carefully inspected the gardens at Bicton, and found every department in the highest state of cultivation, both as regards the crops, and the keeping and general management of the gardens and plants, which are such, as, in my humble opinion, do Mr. Barnes great credit.

The plants have been so fully described by yourself, and Mr. Barnes in his series of letters, that it would be useless for me to attempt a description; but I cannot avoid mentioning some of the most extraordinary specimens that I have ever seen, viz. Lechenaúlt*ia* formòsa and L. bìloba, the ericas in general, and *E*rìca Massòn*i* such a splendid specimen that I do not think there is the like of it in England, or in the United Kingdom.

If any gardener should have the least doubt of what I have stated, I would advise him to visit Bicton and judge for himself. I am sure Mr. Barnes will be very glad to show a brother gardener any thing there is to be seen there.

Lowther Castle Gardens, Aug. 19. 1843.

ART. V. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 499.)

THE designs *figs*. 118. and 119. are flower-gardens characterised by curvilineal walks; and the reason of this is, that these designs are adapted for a surface either raised in the middle and falling towards the sides, or raised at the sides and falling to the centre.

Hitherto the designs that we have given in this article have been for surfaces comparatively flat and level; but the two now before us are calculated for hilly ground or hollows. The reason why curvilineal walks are adapted for hilly ground is, that all sloping surfaces are most easily ascended or descended in directions oblique to their line of slope. When a slope is perfectly regular, like an inclined plane or the glacis of a fortification, the oblique walk by which it is to be traversed may be a straight line, but in every other case curvilineal lines will be found preferable, because less fatiguing, and consequently more agreeable to walk on.

Such designs as those before us are peculiarly suitable for some parts of Scotland, where, in the case of a hollow, the plants may be such as require moist soil or peat earth; and, in the case of a hill, such as delight in dry sandy soil.

In England we have seen such gardens (certainly on a smaller scale than those here represented) formed on artificial knolls; and we could refer to one in which the walks are not laid with gravel or edged in any way, but planted with different species and varieties of dwarf thyme, such as mother of thyme, lemon thyme, green thyme, variegated thyme, &c. For example: in the design, *fig.* 118., the longest walk consists of a series of loops intersecting one another: this walk may be planted with mother of thyme, and the short straight walks which join the loops may be planted with green

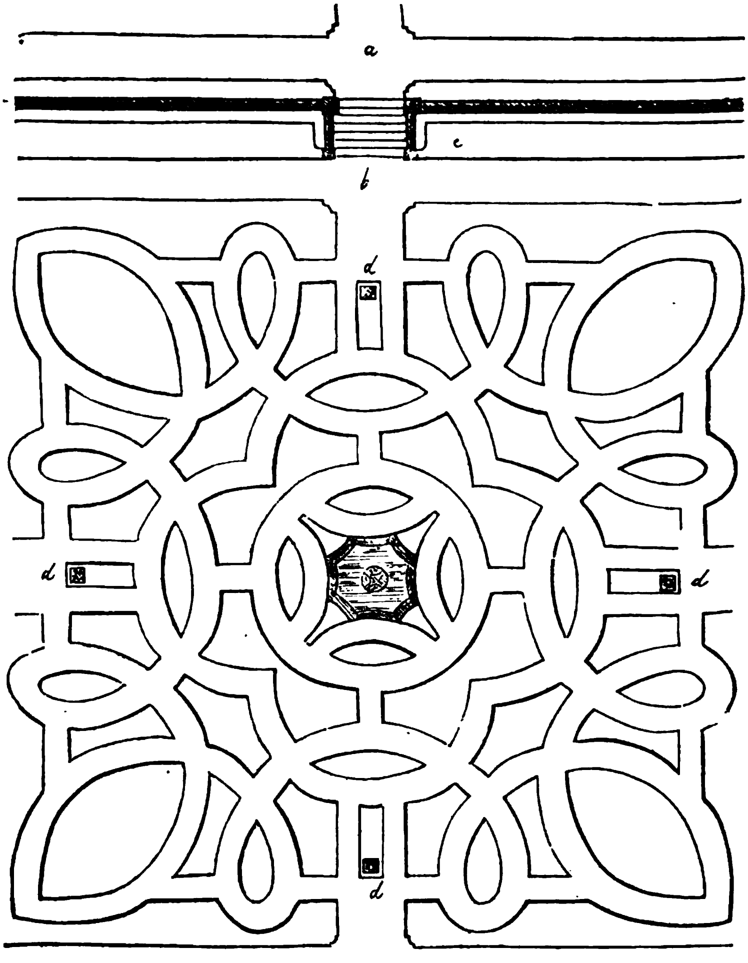

Fig. 118. *Flower-Garden adapted for a Hill with a Sandy Soil.*
Scale 24 ft. to an inch.

thyme; the central walk, including the segments which touch on the water, may be planted with variegated thyme; and the intermediate walk, which consists of four semicircles joined together, may be planted with lemon thyme, which would contrast well with the hoary grey of the mother of thyme, the deep green of the green thyme, and the white variegation of the variegated thyme.

As a further contrast, the small beds, forming, as it were, horns to the octagon basin in the centre, are proposed to be planted with dwarf box, to be shorn quite short in every month of June, so as to present a compact, dark, evergreen surface. The beds for flowers should be planted or sown with dwarf sorts having brilliant colours, so as to contrast strongly with the green of the paths. The outside margin between the paths and the walk *b*, and also the broad flat border *c*, we propose to be planted with dwarf box; and among this green box we propose to plant variegated tree box, so disposed as that, when it is grown a few inches higher than the green box, it may be clipped into an arabesque pattern, in which the forms and lines exhibited in the main figure shall be prevalent; while, at the same time, these lines shall be so combined with straight lines as to harmonise with the boundary lines of the walk *b*, the narrow border at the base of the parapet, and the parallelogram beds at *d*. Each of the parallelogram beds (*d*), it will be seen, contains a pedestal for a vase, though the engraver has omitted the basement of stone on which they stand, and which is made to connect them with the gravel of the walk. Without this connexion, or something equivalent, they would not be architecturally placed; for, as we have often stated, architectural or sculptural objects ought never to appear but where they are in some way or other connected with architecture or sculpture. Hence few things are in worse taste than pedestals rising out of turf or dug beds. There may be a fountain in the centre, where the situation admits of one; but at all events there should be a basin of living water, without which, as Switzer observes, a flower-garden is "drought and misery." *a* is a walk connecting the scene with the house, the conservatory, the kitchen-garden, or whatever other architectural feature it is to adjoin. No detached shrubs whatever are introduced in this design, except a few very low ones, to be trained to the wall at *c;* nor any tall herbaceous plants, because the stagnation of the air which these would produce would be highly injurious to the different kinds of thyme, and prevent them from giving out their fragrance when walked on. It may be proper to observe, that the boundary lines of the walk *b* are to be made curvilineal at the angles, so as to harmonise with the larger beds; and that attention to the principle of harmony must be had in designing the parapet, and in working pedestals into it, and placing vases on them, so as to harmonise the low wall with the pedestals and vases at *d d.* Main entrances, or subordinate entrances, may also be made opposite these pedestals.

Persons who have any predilection for the fragrance of any of the varieties of the thyme recommended for planting the paths in this design, will have no difficulty in reaching the paths containing that variety, and the fragrance, particularly on days in which there is not much sunshine, and in the mornings and evenings, will be found most delightful. When it is inconvenient to plant the whole width of the paths with thyme, edgings will have the effect to a certain extent, as they are necessarily more or less trod upon; and those who do not wish to take so much trouble may have the walks of gravel and sow mignonette in the edgings. As to the flower-beds, a very rich effect will be produced by planting them with dwarf dahlias of dark colours, and pegging them down. By supposing the walk *b* to be 6 ft. wide, a scale to the whole will be easily obtained, viz. 24 ft. to an inch.

The design *fig.* 119. is supposed to be adapted to a hollow where the soil is peat, and, as appears by the five basins of water, either naturally moist, or within ready access to an abundant supply. None of the plants planted in this design should ever be such as rise above a foot in height, but the preference ought to be given to those which do not exceed two thirds of that height. These kinds may be all the truly dwarf sorts of the Linnæan genus *E*rica; indeed the design would make an excellent ericacetum, or, if the soil is dry, it would, planted with dwarf helianthemums, make an excellent cistinetum. Among the peat-earth plants that may be used are, Azàlea procúmbens, Epigæ`a rèpens, Gaulthèr*ia* procúmbens, *E'*mpetrum nìgrum, Kálm*ia* angustifòlia nàna, *D*áphne *C*neòrum, *R*hododéndron caucásicum and *R.* Chamæcístus, *V*accínium *V*ìtis idæ`a, *V.* i. màjor, and *V.* i. mìnor. The edgings to these beds may be made of *V*accínium *V*ìtis idæ`a.

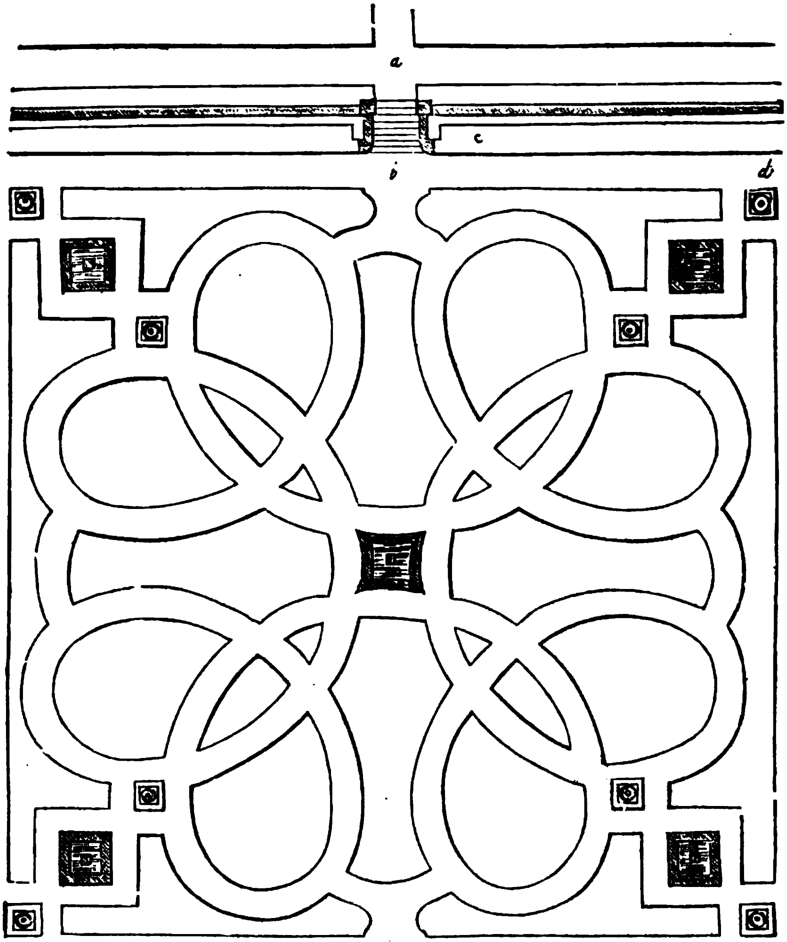

Fig. 119. *Flower-Garden adapted for a Hollow with a Peaty Soil.*
Scale 24 ft. to an inch.

If the source of water be sufficiently high, there may be small jets or drooping fountains in the five basins; and, if possible, it should be so contrived that the water should enter in one basin, then proceed to a second, then to a third and a fourth, passing off by the fifth; thus, by a constant circulation, however gentle, the water will be kept clear and fresh.

The walk *a* connects the garden with the house, or whatever other architectural feature may be judged proper. *c* is a broad border of turf, with a narrow border of a few low shrubs. The rest requires no farther explanation at present.

Before proceeding farther with this article, we shall make some observations applicable to the whole of the designs which we have hitherto given, to which we beg the particular attention of the practical gardener and the amateur, if the latter is not already master of the general principles of composition in landscape-gardening.

It will be observed that, in every design we have given, there are beds of comparatively large size, some quite small, and others of intermediate dimensions; the smaller beds being for the most part of the same character of form as the larger ones. Now the object of the smallest of these beds is, by contrast, to support the magnitude of the larger ones; and the object of the intermediate beds is to preserve a harmonious gradation of form and magnitude throughout the whole design. The principle of contrast becomes thus one of the fundamental principles of composition; and this holds, not only in architecture and landscape-gardening, but in all the fine arts, and even in literary composition. An architect, in a magnificent elevation, contrives to bring in one or two small openings to give effect to the largest ones; he studies this even in the members of his cornices, architraves, and pediments, and if he has but little shade over the general face of his elevation, in consequence of its being without projections or recesses, he crowns the whole with such a far-projecting cornice, as throws down one grand belt of shade, sufficient, by its width and its intensity, to form a contrast to the whole face of the elevation. The Reform Club-house in Pall Mall by Mr. Barry, and some designs in our *Encyclopædia of Cottage Architecture*, by Mr. Lamb, are fine examples of the sort of contrast to which we allude. In every painting there is a prevailing mass of some particular colour in one part of the picture, but in other parts there are subordinate masses and very small indications of the same colour, put in by the artist in order to support and harmonise the principal mass. The same may be said of the shades of a picture, and even of the forms. See Burnett *On Painting*, and Howard *On Colour as a Means of Art.*. For example, you do not find in the picture of any good artist, who has been allowed to follow his own taste, a landscape having Highland mountain scenery in the distance and a smooth unbroken lawn in the foreground; but the lawn is broken up or varied by forms, perhaps those of the shade of the castellated mansion, or of the foreground, broken up on purpose, so as to produce such a piece of ground as nature requires, but still differing from the vegetation of the locality, in being planted with exotic shrubs. The same application of the principle of contrast is attended to in historical pictures, as may be seen even in Hogarth's, where the main subject is the wrangling of human beings, and the contrasting one some dogs or cats fighting. Every piece of music has its accompaniment. In all dramatic pieces there is not only a plot, but a by-plot; and there is the same in novels and romances.

Footmen, even in giving the fashionable raps of the London street-door, contrive to combine loud sonorous raps with smaller, and very small ones; the whole forming a sort of harmony that is not very easy to imitate. The post gives two knocks; but an ordinary professional teacher of music or languages is only entitled to give one, yet this, in contrast with a very small knock, he contrives to render effective in distinguishing his knock from that of a common servant.

> " First one, and then a little one behind,
> As if the knocker fell out of his fingers."

The last paragraph on knockers might perhaps have been spared as of no great use, but it will serve, by contrast, to enhance the value of those on architecture and painting which preceded it.

Now so entirely ignorant are most practical persons of these principles of composition and their application, that we will venture to say that if any one of the fifteen, or whatever the number may be, designs given in this article were sent to a gentleman's gardener or nurseryman to be laid out, the first thing he would do would be to get rid of all the smaller beds, swelling out the larger ones so as to occupy an additional space equivalent to that gained by obliterating the small beds; or probably letting the large beds alone and occupying the place of the small beds with lawn or gravel; or perhaps with some favourite tree or shrub that he might have and wish to dispose of. We are justified in using strong terms when speaking on this subject, by what we have seen in the neighbourhood of London, and in fact in every part of the island.

With regard to gentlemen's gardeners we can with still more confidence say, that, if any of these designs were given to them to carry into execution, they would do precisely what the nurseryman would do, unless prevented by the peremptory fiat of the master or mistress, in consequence of either or both having a knowledge of the principles of composition.

But some gardeners will go much farther than this; and, after the artist has got his design laid out on the ground, explaining every detail to them as the work proceeded, and after it has been finally approved of by the master or mistress, will, when the artist is gone, make alterations according to their own taste. A notable instance of this kind occurred to us about two years ago, the details of which we may probably give hereafter.

Let it not be imagined from this that we do not wish gardeners and nurserymen to lay out flower-gardens and pleasure-grounds; on the contrary, the whole of our publications, and more especially our various articles in this Magazine, have been written with a view to bring forward young men in gardening as an art of design and taste. It must be confessed, however, that it is hardly possible for a young man to acquire much knowledge of gardening as an art of design and taste, and at the same time get a competent knowledge of the principles of horticulture as founded on botany, chemistry, geology, and meteorology, together with sufficient time to apply these principles, or see them applied in different parts of the country: in a word, to have sufficient knowledge as a journeyman to qualify him for a master's place at the age of twenty-five or thirty. The wonder is, that with such low wages, such unhealthy gloomy lodgings, with so many hours work per day, and the necessity of perusing a number of books, that they should have made themselves what they are. We can, therefore, excuse them for their want of knowledge in our department; but we cannot avoid condemning that overweening self-conceit so general among young gardeners, and especially Scotch ones, which leads them to think that they know a great deal more than they do, and hence to interfere in matters that they do not thoroughly understand.

Nothing can be more common than when an artist goes to a country residence and walks round with the gardener, to hear the artist who has been last employed there decried, and any thing good that he did attributed to the suggestion of the gardener or his employer. It is natural for persons who have not had their moral powers properly cultivated, to wish to be able to say such things of every man as may bring him down somewhat nearly to their own level. This is human nature in an uncultivated state; but young gardeners, who ought to be phrenologists to a certain extent, and guided by such moral principles as have been adopted by the West London Gardeners' Association, ought to know better. We intend to resume this subject in our next Number.

(*To be continued.*)

Art. VI. *Hints to Proprietors who intend planting Pleasure-Grounds, Shrubberies, or other ornamental Plantations.* By the Conductor.

Few will deny that the chief source of the beauty of shrubberies and ornamental plantations is, the variety of trees and shrubs which are displayed in them. A good deal, no doubt, depends on the character of the ground, the distance, and the arrangement; but still the grand source of the beauty and interest, more especially in the present times, when every body is a botanist, and every gentleman under fifty an arboriculturist, is the number of species and varieties of handsome trees and shrubs. In the time of Uvedale Price, when there was not a twentieth part of the species and varieties of trees and shrubs in cultivation which are now in the country, the great object of the landscape-gardener was to create picturesque beauty; and even so late as the time of the publication of the late Sawrey Gilpin's book (see Vol. VIII. p. 700., and Obit. p. 332.), the trees and shrubs recommended by him, both in his book and in his reports, were chiefly "cedars, cypresses, stone pines, and filereas" (meaning pinasters and phillyreas). In the present day, however, we not only study to display, in pleasure-grounds and shrubberies, the picturesque, but the gardenesque; and accordingly there is no limit to the variety of trees and shrubs that may be introduced, and that with admirable effect.

We are persuaded that there are very few country gentlemen, or amateur gardening ladies, who have either any idea of the number of species of trees and shrubs which are cultivated in some nurseries, or of the very low price at which these may be purchased. In our preceding Number, p. 504., we gave an analysis of the recently printed sheet catalogue of hardy trees and shrubs of Messrs. Whitley and Osborn of the Fulham Nursery, to show the number of species and varieties it contained, amounting altogether to 1591 species and varieties. We have since got Messrs. Whitley and Osborn to put the prices to their catalogue, and the following is an analysis of it, with reference to the number of species and varieties that may be procured for different sums from 10*l.* to 230*l.* It must be borne in mind that the prices are supposed to be for a single plant, or at most two plants of a kind, the object being to supply collections for arboretums, or collections for shrubberies or pleasure-grounds: but, if several plants were required, the prices would be greatly reduced; some of the plants, as the common elm, Scotch pine, and spruce fir, for example, when bought by the thousand, to less than a tenth of what is here charged. This, however, applies to but very few species and varieties. It should also be taken into account that none but vigorous plants are sent out of the Fulham Nursery, a precaution absolutely necessary when only one plant of a kind is sold; and that these plants are all correctly named, we can assert from personal examination while preparing the *Arboretum Britannicum.*

Analysis of Messrs. Whitley and Osborn's Catalogue of Hardy Trees and Shrubs for 1843-4, *with reference to the Prices of the Plants.*

			£	s.	d.		£	s.	d.
Number of Trees from 3*d.* to 6*d.* -	5								
— — Shrubs from 3*d.* to 6*d.* -	16								
Species and varieties	—	21 for	0	9	11				
Trees at 9*d.* - - -	8								
Shrubs at 9*d.* - - -	57								
Species and varieties	—	65 for	2	8	9				
Trees at 1*s.* - - -	32								
Shrubs at 1*s.* - - -	112								
Species and varieties	—	144 for	7	4	0				
All the preceding species and varieties, viz. - -		230				for	10	2	8

			£	*s.*	*d.*	£	*s.*	*d.*
Number of Trees at 1*s.* 6*d.* - -	206							
Shrubs at 1*s.* 6*d.* - -	400							
Species and varieties	—	606 for	45	9	0			
All the preceding species and varieties, viz. - -		836				for 55	11	8
Trees at 2*s.* - - -	2							
Shrubs at 2*s.* - - -	5							
Species and varieties	—	7 for	0	14	0			
Trees at 2*s.* 6*d.* - -	247							
Shrubs at 2*s.* 6*d.* - -	177							
Species and varieties	—	424 for	53	0	0			
All the preceding species and varieties, viz. - -		1267				for 109	5	8
Trees at 3*s.* 6*d.* - -	54							
Shrubs at 3*s.* 6*d.* - -	41							
Species and varieties	—	95 for	16	12	6			
Trees at 5*s.* - - -	39							
Shrubs at 5*s.* - - -	127							
Species and varieties	—	166 for	41	5	0			
Trees at 7*s.* 6*d.* - -	13							
Shrubs at 7*s.* 6*d.* - -	9							
Species and varieties	—	22 for	8	5	0			
Trees at 10*s.* 6*d.* - -	8							
Shrubs at 10*s.* 6*d.* - -	5							
Species and varieties	—	13 for	6	16	6			
Trees at 21*s.* - - -	10							
Shrubs at 21*s.* - -	4							
Species and varieties	—	14 for	14	14	0			
Trees and Shrubs at 30*s.*	2							
Species and varieties	—	2 for	3	0	0			
Trees at 31*s.* 6*d.* - -	3							
Shrub at 31*s.* 6*d.* - -	1							
Species and varieties	—	4 for	6	6	0			
Trees at 42*s.* - - -	3							
Shrubs at 42*s.* - -	2							
Species and varieties	—	5 for	10	10	0			
Tree at 63*s.* - - -	1	1 for	3	3	0			
Trees at 105*s.* - -	2	2 for	10	10	0			
						121	2	0
Total species and varieties -		1591						
Total cost of Messrs. Whitley and Osborn's collection, exclusive of 193 species and varieties, to which, there being no strong plants for sale, no prices are affixed in the catalogue						£230	7	8

It would thus appear that 230 species and varieties of trees and shrubs, none of which exceed 1*s.* each, may be obtained at a cost of 10*l.* 2*s.* 8*d.*; 606 species and varieties at 1*s.* 6*d.* may be obtained for 45*l.* 9*s.*; and 431 species and varieties may be added to the above, the prices varying from 2*s.* to 2*s.* 6*d.*, for 53*l.* 14*s.*; in all 1267 species and varieties for 109*l.* 5*s.* 8*d.*

We shall not go into the details of any of the higher prices, because, in general, we think 2*s.* 6*d.* per plant quite enough for all ordinary occasions. It will be observed by the analysis, that the total number of species and varieties of plants which are charged from 3*s.* 6*d.* to 7*s.* 6*d.* is only 283, and which amount to 66*l.* 2*s.* 6*d.*; 13 plants are charged at 10*s.* 6*d.*, and from one guinea to five guineas only 28 plants. The plants for which more than 7*s.* 6*d.* are charged we consider exclusively for amateurs or the very wealthy: the prudent and economical proprietor will wait a year or two, till, by propagation, or the introduction of seeds from foreign countries, the price of these plants be reduced to 2*s.* 6*d.*

Now it so happens that there is no other collection of trees and shrubs in

Great Britain that is so complete, and so correctly named, as that of Messrs. Whitley and Osborn. There are very large collections, such as that of Messrs. Loddiges, and the nomenclature of that collection is exemplified in the Abney Park Cemetery. Mr. Rivers of Sawbridgeworth has also a very good collection, with many rare kinds, as we have seen, p. 55. Mr. Gregory of Cirencester, and Mr. May of Leeming Lane, have large collections, and there is a very full one at Messrs. Dickson's of Chester. In the nursery of Mr. Masters of Canterbury, we believe, there is a good collection, as there may be in various other English nurseries that we cannot recal to mind. We saw the principal nurseries in Scotland in 1841, and we can vouch for the kinds being comparatively few and wretchedly named, except in Lawson's nursery. George Don, by order of the Commissioners of Woods and Forests, having correctly named all the trees and shrubs supplied by Messrs. Loddiges to St. James's Park and Kensington Gardens, any country nurseryman may bring or send in specimens, and correct their names by these living plants. We mention this, because the first thing that will be said by a certain class of nurserymen will be, that we have some pecuniary interest in recommending Messrs. Osborn. We reject the insinuation and the insinuators with contempt.

It may safely be stated that there are very few nurserymen, either in the neighbourhood of London or throughout the country generally, that propagate more than twenty or thirty kinds of hardy trees and shrubs; and how, under these circumstances, is it possible that they can supply country gentlemen with much variety in their pleasure-grounds? The nurserymen, indeed, do not pretend to offer much variety. When a gentleman employs them to plant a pleasure-ground or shrubbery, they plant it with articles by the score or by the hundred, and probably add to these some new Himalayan or Mexican plants, which give the idea of something new and rare, and at the same time swell out the amount of the bill. This thirsting after rarity and novelty, to the exclusion of what is good and beautiful, we hold to be in very bad taste. We find in country nurserymen's advertisements at this season of the year, when planting is expected to commence, a large stock announced of hollies, Portugal laurels, common laurels, laurustinus, and other "leading kinds" of evergreen shrubs. Gentlemen, and also their gardeners, are generally anxious to add a plant or two to their pleasure-ground once a year, and some new pine or fir, or other extravagant-priced plant, is generally fixed on, which is often planted in some crowded improper situation, where in a year or two it gets killed and is no more heard of.

Now what we would recommend to gentlemen or ladies, when they desire to plant a shrubbery or pleasure-ground, is this. First, procure one plant, or two if you have room, of all the low-priced trees and shrubs, or at least as many of them as you have not already specimens of, or as your ground will hold (and an acre will contain at least 500 plants independently of the spaces required for glades and walks); then, after procuring the 230 kinds that you can get for 10*l.*, add as many as you can afford from the plants at 1*s.* 6*d.* each, of which, by the analytical table, you will find 606 species and varieties, which can be got for 45*l.* If you have still more room, there are 424 beautiful flowering trees and shrubs that you can procure for 2*s.* 6*d.* each, or 53*l.* We do not recommend you to go to a higher price, but we insist upon you, if you wish to make your pleasure-ground or shrubbery what it might be at the least possible expense, to beware of the common stuffing generally sent in for planting shrubberies and pleasure-grounds by nurserymen. Beware also of all high-priced plants, if you wish to accomplish a great deal with limited means, and if you do not intend to run the risk of great losses.

Gentlemen's gardeners can hardly be very eager for reform in planting pleasure-grounds and shrubberies, except those who have been some time in the Horticultural Society's garden, or in the Fulham Nursery, or have studied in the Derby Arboretum; because, there really is no other garden or nursery in Britain where the kinds are correctly named.

It is for gentlemen and gardening ladies themselves to bring about this reform; and, to do so, they have only to insist on planting collections, instead of a few kinds for ever repeated. This will effect a double good; it will establish collections in pleasure-grounds, and add immensely to their interest; and it will render necessary the propagation of a great number of species and varieties in nurseries, which will greatly increase the business.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Domestic Notices.*

SCOTLAND.

Yu'cca *gloriòsa.* — Among the various productions of Flora which adorn the far-famed gardens of Britain, none rank so high in the estimation of the florist as some of those wonderful plants in the different tribes which compose the natural orders Amaryllí*deæ*, Bromeli*àceæ*, *A*sphodèleæ, *Tulipàceæ*, &c.; so much so, that the celebrated Linnæus designates them, "the nobles of the vegetable kingdom." Our Saviour, in his sermon on the mount, when exhorting his disciples to take no thought for their raiment, points out to them the grandeur of some one or other of the plants supposed to be in one of the above natural orders, by saying, "Consider the lilies of the field, how they grow, they toil not, neither do they spin; and yet I say unto you, that Solomon, in all his glory, was *not* arrayed like one of these." Among the most magnificent of these noble plants which have flowered in Scotland, the following have been considered as splendid specimens of their kind: — the Doryánthes excélsa of New South Wales, which flowered in the nursery of Mr. Cunningham of Comely Bank, Edinburgh, in the year 1824, the flower stem of which attained to the height of (I think) 29 feet, finely branched, with many hundreds of splendid flowers; two plants of the same sort, which flowered successively, a few years afterwards, in the garden at Woodhall near Hamilton, and were noble specimens; the Agàve americana, or American aloe, which flowered in the princely gardens at Drummond Castle, in the year 1832, with a flower stem 23 feet high, and beautifully branched like a chandelier, with a large umbel of flowers on each branch; and the *Yúcca* gloriòsa, which flowered in the garden at Blairdrummond, in the year 1835, the flower stem of which attained to the height of 12 feet, branched in a pyramidal form, with 1245 flowers. The above plants, when in flower, attracted a great concourse of visitors, not only on account of their elegance and splendour, but also on account of their being but seldom flowered in perfection in this quarter of the world. There is at present a very fine specimen of the *Yúcca* gloriòsa in flower in the garden at Blairdrummond. The height is 9 ft. 6 in., with 40 branches, bearing in all 1150 hexapetalous bell-shaped flowers. The flowers are arranged in threes, around the stem of the lateral branches, and are on short footstalks. The flowers are of a light cream-colour inside, and tinged with pink outside. The *Yúcca* gloriòsa is of the 6th class and 1st order (Hexándria Monogýnia) of Linnæus, and the natural order *Tulipàceæ* or *L*iliàceæ of Jussieu, is a native of America, and was introduced into this country in the year 1596. The plant at present in flower at Blairdrummond is a sucker from the root of the plant that flowered in 1835, and is at present seven years old. The first winter after being removed from the mother plant (which died down to the surface of the ground), it was kept in a pot in the vinery, and in spring planted out in the open border in front of one of the peach-houses, and copiously watered several times during the succeeding summers with liquid manure. A slight covering of silver-fir branches has been sufficient to protect it from the frosts of winter, and last winter a mat was only thrown over it a few nights when very hard frost occurred. Its flowering this summer may be attributed to its getting very dry at one time last summer, and the check it would receive by being so seldom protected last winter. (*J. D.*, *Blairdrummond*, in the *Stirling Advertiser* for Aug. 25. 1843.)

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GARDENER'S MAGAZINE,
NOVEMBER, 1843.

ORIGINAL COMMUNICATIONS.

Art. I. *Comparative Physiology.* By R. Lymburn.

(*Continued from* p. 512.)

On *Absorption in Vegetables* he says: "In the lowest plants we find this function performed under its most simple conditions. The simplest algæ, as Protocóccus nivàlis, consist of individual cellules, each capable of nutrition and reproduction. The higher confervæ and sea-weeds consist of masses of cellules united into a leaf-like expansion, which performs the nutritive and reproductive functions on all parts of its surface, any semblance of stem and roots appearing only to give the means of attachment. The lichens are similar in form and structure to the algæ, but the different situation appears to produce a separation in the functions; reproduction being confined to the upper surface, which from exposure gets hard and dry; while it is by the lower surface, usually soft and pale, that the nutriment is probably absorbed, and it is frequently furnished with hair-like appendages resembling roots. The lower groups of fungi seem to imbibe by their whole surface, while the more complex mushrooms have the reproductive system separated from the nutritive by a stalk, whose base is prolonged into radical fibres, by which, and probably also by the hairs on the surface, the food is introduced into the system.

"In ascending through the tribes of Cryptogàmia the functions get more specialised, though when these special organs are undeveloped, or insufficiently supplied, the general surface can supply the deficiency. The whole surface of the radical fibre in Cryptogàmia is endowed with the power of absorption, except in ferns, which approach Phanerogàmia, or flowering plants; in which fluid is admitted through the succulent extremity alone, the function being more actively performed in proportion to the diminution in amount of surface they expose. The simplest form of roots consists of single fibres from the base, as in hyacinth and other bulbs and tubers; but more often the fibres proceed from ramifying branches of woody texture, as in trees and shrubs. Each fibre differs from those of cellular plants by the possession of a bundle of vessels (woody fibre and ducts) which occupy its centre. The spongiole is the growing point of the root, the soft lax texture of which possesses in an eminent degree the power of absorption. As the radical fibre elongates, the spongiole becomes consolidated into the general structure of the root. The extension takes place by the addition of fresh tissue to the points, in the direction of least resistance, causing the root to grow towards moisture, not from instinct but from less resistance. The long descent of roots along bare rocks, perpendicularly and horizontally in quest of earth, is, however, difficult to explain. The absorbent power of the spongioles appears limited by the size of the pores, which, though hitherto undetected, must have a sensible diameter. The most finely divided particles in coloured solutions, and the most watery portions of solutions of sugar, gum, &c., are always taken up first. The power of *selection,* however, would seem to extend beyond this, as of some substances in solution, some plants will take one and some the other, and some neutral salts are rejected altogether. It does not appear, however, that the selecting power is employed to prevent the introduction of deleterious matter. From the little at present known on the subject, it seems a reasonable inference that the rejection of any particular ingredient in the fluid in contact with the roots, results either from the want of adaptation in the form or size of its molecules to the pores of the spongiole *, or from an organic change effected by it on their delicate tissue, such as is proved by the experiments of M. Payen to occur when tannin enters into the solution, even in very minute proportion."

From the similarity between lichens and algæ above noticed, it may be inferred that what have been reckoned instances of equivocal generation may rather be due to the circumstances they are placed in causing the same plant to assume a different appearance; and what have been reckoned of distinct genera and species may, after all, only be different states of the same plant. It is not at all probable that the action of roots, and their food, on each other, can claim the high rank of instinct. That roots do act on the food, however, is generally believed. In two pots of charcoal exhibited for experiment in the Horticultural Society's gardens, the one having a growing plant inserted in it, the other without any plant, but treated in exactly the same manner in every other respect, it was found that much more of the charcoal was consumed in the one which had the growing plant inserted; evidently pointing out that the fibres had exerted some influence in dissolving as well as absorbing the food. As I mentioned before, it is probable that the excretion of some nitrogenous substance from the roots (nitrogenous substances, as diastase, &c., being powerful solvents) greatly assists in such action; though the contact of the roots, furthering the removal of carbonic acid, &c., as formed, may be part of the cause also. The spongioles may also act, as living vessels are generally supposed to do, on their food by attraction; and their vital powers may produce some action in which electricity is concerned, though not to such extent as the assimilating organs. There is no proof, however, of streams of electricity issuing to decompose the food, as supposed by some. It is evident also, that the food exerts some influence on the direction of the roots, perhaps something of the nature of stimulus. Mr. Knight, in his experiments, found that, when he buried the manure deep in the ground, the roots of the plants sown on the surface descended at once in a spindle form, without any tendency to ramify; but when he spread the manure near the surface, the roots of the same kind of plant ramified in all directions in quest of the food. He found, also, that, when he made trenches of loose ground in the midst of solid ground, the roots preferred ramifying in the loose soil to penetrating the solid, showing their tendency to extend in the direction of least resistance. More food would also be found in such situations. In quaggy miry land, the roots of the plants that thrive thereon are found to prefer running along the surface to obeying the natural impulse of gravity, though no resistance is presented to their penetrating downwards, preferring the situation where food of the best description is to be got. Mr. Knight considered that gravity was the cause of roots descending, which impulse, he said, they would always be found to obey, unless prevented by resistance or the presence of food; such instances as the above, of roots travelling long distances perpendicularly and horizontally in quest of earth, he explained on these principles. In the experiments above narrated on manure buried deep, and merely pointed into the surface, Mr. Knight found the crop on the portion manured on the surface to exceed that where it was buried deep in an immense degree; showing the benefit of feeding seedling crops as soon as possible after the evolution of roots. Much of the success of seedling crops, especially such as turnips, depends on starting them with vigour. Of the bad effects of tannin on the roots I have had experience in cauliflower and other plants sown above hot tanner's bark, when deficient of fermenting stable manure. The plants vegetated strongly, and had a good appearance, but, after pushing the third or fourth leaf, set up altogether in growth, and got hard and woody in texture, and of a brown colour, as if pervaded with the tannin. It probably acts by its astringent property causing the pores of the spongiole to contract.

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* Dr. Daubeny has found in his experiments, that salts of lime, magnesia, and others that are isomorphous, are absorbed by the same plants; while they refuse such as those of strontia, which have a different crystalline arrangement.

Dr. Madden thinks it possible that plants may have an instinctive relish for that kind of food which contains the requisites needed for their present wants in greatest perfection. It does not appear, however, that plants have any thing like instinct in the power of selecting by the spongioles; this is probably confined to the assimilating organs. It has been said that the power of selecting is proved by such plants as peas having little silex in their composition, while others, such as grain crops (grasses), are found to abound in silex in the stems. The one plant abounding in one substance in which the others are deficient, though growing beside each other, and having the same food supplied to the roots, is thought to be a proof of a selecting power in the spongioles. This power, however, more probably resides in the assimilating organs of the grasses possessing a power of appropriating silicates, which those of the pea do not possess. In the experiments before noticed of Vogel, it was found that plants in general absorb rapidly so much of saline substances as to destroy them, even of such as nitrate of potash, which is well known to benefit plants in small quantities. Saussure found solutions of sulphate of copper and sugar to kill plants more rapidly than most other substances, which were the two of which the greatest quantity was absorbed.*

It is evident, therefore, that, as small quantities of the deleterious substances of Vogel are to be found in many soils naturally, and as even the most nourishing, as sugar, were found to be hurtful in excess, plants must possess a power of excreting deleterious substances, which would otherwise collect and destroy. The fluid in the soil may be absorbed by the pea and the grass of the same quality unaltered, only the pea will have to reject and excrete the silicates that are not needed for its stalk; and so with any plant for any substances not needed. Some few plants may possess a particular power of rejecting some substances, as the chara found by Vogel not to absorb sulphate of copper, probably from the form of its pores. But few instances are on record, however, of such powers being possessed; on the contrary, it seems generally allowed, that all soluble substances, deleterious or not, are absorbed indiscriminately. It follows, therefore, as some deleterious substances may very soon collect in such quantities as to be hurtful, and as all, even the most nourishing, have a limit beyond which they are in excess and prove hurtful, that plants must possess a power of excretion; and, as many of these substances are not easily evaporated, that they must be excreted by the roots. Liebig (who takes the excretionary power as undoubted), in his *Agricultural Chemistry,* in the excellent chapter on alkalies, notices that every plant has certain kinds of acids and alkalies that it prefers, but, in certain situations, is found to change these for others, when the proper kinds are not contained in sufficient quantity in the soil. Marine plants possessing soda in their natural situations, are found to have the soda replaced by potash in soils deficient of the former and abounding in the latter. Trees generally found to have their acids united to potash have, in saline soils, been found to have the potash replaced by soda. In some soils, where there was a deficiency of matter to furnish materials for the ordinary vegetable acids, they have been found replaced by mineral acids, as the sulphuric, &c. All these instances point out that, where the normal acids and bases are found in sufficient quantity, all others not suitable, though capable of passing the pores, and certainly carried up in the ascending sap, as proven by their being sometimes assimilated, are yet, when the normal substance is to be had, undoubtedly rejected and excreted. Even the normal sort, if in excess, must also be excreted. Liebig notices that the quantity of potash in wheat was found to decrease much in amount as the plant came to maturity. Schlieden (who has doubts as to plants possessing the faculty of excretion by the roots) says this is owing, not to the wheat parting with its potash, but to less being assimilated by the ripening plant; and, as the other parts increase more than potash at this period, the proportion is less, though the original quantity is not diminished. This, however, does not alter the case; for, if the water absorbed contains nearly the same quantity of potash as before, which is generally likely to be the case, if less is assimilated more must be rejected. No doubt the young growing parts possess most unassimilated alkalies in the circulating sap; but the quantities of these contained in a soluble state in the water of the soil are generally much more than needed. Professor Johnson describes potash, soda, &c., as carriers of organic substances, dissolving and uniting to the vegetable substances found in the soil, which they part with, giving them up to be assimilated, and are again excreted to dissolve fresh portions and be again absorbed. On the whole, the general opinion seems to be, and is most likely to be correct, that many substances are taken up besides those needed, and must be rejected, as also needful substances when in excess; and this is likely the cause of what has been ascribed to selection. It has been also said that, as leaves reject nitrogen, so may spongioles possess a power of rejecting also: it is not proved, however, that leaves reject or cannot absorb nitrogen, nor does it follow that spongioles are similar though it were. It may not appear proved that roots have the power of absorbing gaseous substances as such, unless dissolved in water; at least it is said in experiments on record that they do so, and some assert they cannot. Thomson says Saussure has proved that roots absorb oxygen as well as leaves; and Liebig talks of it as certain. If oxygen is absorbed by the roots in this way, so may atmospheric air and nitrogen.

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* He also found that, when the roots were cut, all substances were absorbed with equal rapidity, showing that the form and size of the invisible pores had regulated the quantities before they were cut. Boucherie, it is said, in the absorption of saline substances by trees, found the cut ends of certain trees to reject some substances which other trees took up.

"The *quantity* of fluid absorbed, and the force with which it is propelled upwards in the stem, vary in different species and individuals, also at different periods of the year and day. It seems intimately connected with the activity of the other processes of vegetation, and especially with the quantity of vapour transpired from the leaves. Hales found that, when the sap of the vine was rising rapidly, a column of mercury, 26 in. high, nearly equal to 31 ft. of water, might be supported by the propellent force of the absorbent organs: the power diminished, and after a time ceased altogether, when the upper part of the plant was cut off. The mere act of absorption, there is much reason to believe, is due to the physical property of the membrane to produce endosmose; the difference of the density of the fluids necessary for the commencement and continuance of this action being supplied, in the first instance, by the store of nutritious matter obtained by the embryo from its parent, and latterly by the mixture of a portion of the dense elaborated descending sap with the crude ascending fluid. Professor Henslow likens the carrying off of the sap as imbibed by vital action, producing further demand, to the combustion of oil in a lamp. DeCandolle's axiom (that when a particular function is not sufficiently carried into effect by the organs ordinarily appropriated to it, it is performed wholly or in part by another) is the result of the general principle, before laid down, that the general surface of a plant can perform, in a considerable degree, the functions of all the rest. When the roots are absent or imperfect, as in *O*rchídeæ, absorption is performed through the leaves; and when these are absent, as in *C*ácti, through the stem. Bonnet experimented on plants of *M*ercuriàlis, by immersing the roots only of some plants in water, while the leaves only of other plants were allowed to touch the fluid; and he found, after five or six weeks, that those which imbibed by their leaves only were nearly as vigorous as those that had absorbed by the roots. It is by the under surface of the leaf, where the cuticle and cellular tissue are least compactly arranged, that absorption is performed with the greatest rapidity. The downy hairs so plentiful on some plants seem to contribute to this function, acting like rootlets, and are always most prevalent in the same species, and even in the same individual when transplanted, in hot dry situations. Plants faded by intense light and heat are refreshed obviously by moisture in the air.

"In the younger stages of the higher plants, as they approach to maturity, we may trace the same progressive stages of developement in this function as has been done from the lower to the higher plants. The embryo, at its first appearance in the ovule, is nothing but a single cell, like the lowest plants, and gradually absorbs by its whole surface as those do. In the early stages of germination, the first prolonged radicle resembles that of the fungi or mosses; it is not till the true leaves are developed that the root begins to ramify and produce perfect fibrils, having woody fibre and vessels in the interior, terminated by spongioles. The *special* structure is thus constantly observed to arise out of one more *general;* and, even where the *special* form is most highly developed, the *general* structure retains, in some degree, the primitive community of function which originally characterised it."

The force by which the sap is propelled upwards, which belongs more properly to the function of circulation, has by some been described as proceeding from electrical attraction and repulsion, producing currents like magnetism. Currents of electricity are supposed to pervade all bodies, and have been said to render the human body susceptible of being mesmerised, or put into a magnetic sleep. Others say that electricity affects all vital action, and will probably be present as partly either cause or effect. The contractile power of the vegetable tissue, which is believed by many the principal agent both in the ascent and descent of the sap, is probably affected by electricity, or elicits it by its action. Professor Thomson (*Veg. Chemis.*, p. 986.) says, "it is impossible to account for the motion of the sap in plants wholly by any mechanical or chemical principles whatever." The vessels themselves, he says, certainly contract, and many philosophers have ascribed the ascent to irritability; there are not wanting proofs that plants are possessed of it, and Saussure has given a precise view of its mode of action. This power may reside in the vessels along which the sap moves, or in the cells, as DeCandolle supposes. Müller (p. 299.) says: "It has been proved by Dutrochet, that the organs which effect the ascent of the sap in plants during the spring are the terminal parts of the root; that the whole force by which the sap is impelled upwards is a *vis à tergo* exerted in the roots. That the attraction of the upper part of the stem is not the cause of ascent was proven by the stem of a vine, cut by Dutrochet at 6 ft. from the ground, continuing to pour forth sap uninterruptedly. That it did not reside in the stem was proven by the flow at the upper part of the stem ceasing the moment it was cut by the ground; while the portion of the root in the ground still continued to pour forth sap, though successively cut after clearing away the soil, till the terminal parts of the root were reached, thus showing the seat of the constant absorption of the sap, necessitating the ascent, to be there. The ascent by the central vessels of the fibre was shown by a cut radicle placed in liquid, with the conical point immersed, being found, by the aid of a lens, to have its cut surface covered with moisture, which issued first from the central part. Agardh attributes the ascent of the sap to a polarising action of the roots and leaves, by virtue of which roots attract and leaves exhale, like the opposite poles of a magnet." To give the propelling power, however, the name of a *vis à tergo* is no definition. If the polarity produced by currents of electricity were generally admitted, or had rested on proof by experiment, not on assumption, then we would have had a force from behind capable of definition. The endosmose power is at present received as the main agent in absorption. Coupled with this, we have the opinions of De-Candolle, Knight, and others, who supposed the propellent power principally a vital action produced by the contractility of the tissue. On these principles, the phenomenon of endosmose should be greatly assisted by the exhalation from the leaves, as it was found by the experiments of Hales to be; and, though in the above experiments of Dutrochet the vine was found to pour forth sap for a time after being cut, it could only arise from the peculiar force of the circulation in that plant (which is described in the *Library of Useful Knowledge* as having been sometimes found to support a column of mercury 38 in. high), and could only continue so long as the descending sap had power to thicken the ascending fluid sufficiently to produce endosmose. Had the leaves been on the stem, the quantity absorbed, and, of course, the propellent force, would have been found greater. Had the lower end of the cut stem been immersed in fluid, it would have continued for a time to issue at the upper end as before; and, had the spongioles been removed from the water of the soil, the phenomenon of circulation would probably have ceased altogether, showing the absence of any *vis à tergo.*

In very soft herbaceous plants, the cut ends of stems and under surfaces of leaves are found to carry on growth for a considerable time, and some succulent plants, as Ficus elástica, which do not require much water, are found to thrive nearly as well with the roots out of the soil as in it, provided the atmosphere is moist; all these point out the general spread of the function of absorption, produced wherever the tissue is soft and circumstances render it necessary. For plants in general, however, wherever a special apparatus of roots is provided, their being deposited in the earth is found essential to produce perfect growth: the hyacinths grown in glasses are never found to have the same luxuriance nor produce new roots in the same perfection as those grown in the soil. The flagging of foliage so perceptible in warm sultry weather has been generally ascribed to increased exhalation, and has been found to cease when the air gets suffused with moisture. By some it has been referred to electricity, as a main cause; and, as the same moisture which assists absorption also conducts off electricity, it may be difficult to say how far the opinion is right. The stomata are allowed to be the breathing-pores for the inhalation and exhalation of gaseous substances; the exhalation of water is also confined to the same organ, at least to the under surface of the leaf, where they generally reside. As an illustration of change of function, it is probable that when absorption is insufficiently performed from the want of roots, or circumstances prevent their efficiency, the stomata, when placed in contact with moisture, perform the office of absorbents also. In such succulent stems as Cácti this is probably a normal function which they perform constantly, and the refreshing dews of the evening are probably introduced principally through their instrumentality in all.

The next section, on Digestion and Absorption in Animals, is very interesting; indeed, the sections devoted to animals are in all the functions the most interesting, from the complexity of the function as it becomes more specialised; but the intention of the present essay being only to introduce as much of animal physiology as will serve to illustrate that of vegetables, this will be found sufficiently done in the extracts from the functions considered generally. For those who wish to make themselves masters of the details, and to have more than an outline of the subject, which is all that can be done in an essay, the book itself will be indispensable.

In Chap. VI., *On the Circulation of the Nutritive Fluid generally considered,* he remarks: " In beings of the most simple organisation, where the materials of the tissues are supplied throughout the whole surface by the constant permeation of external nutriment, no transmission of fluid from one portion of the system to another seems necessary; and accordingly we find no evidence of it, either in any structure set apart, or in any visible motion of the fluid. In more complex organisms, however, where a small part only of the surface is appropriated to absorption, it becomes necessary that means should be provided of conveying to distant parts the nutriment they require. This is effected by the circulation of the fluid absorbed through vessels and passages adapted to that purpose, and its developement is proportional to the limitation of the absorbing system. Besides the conveyance of the nutrient fluid to the remoter parts of the system, the crude aliment must be exposed to the influence of the air before becoming fit for its ultimate purpose, and the fluid once passed through the tissues must undergo a similar process to restore it to its proper condition. This process, respiration, requires the circulating fluid to pass through certain organs during some part of its transit, which bring it into relation with the atmosphere. The uninterrupted performance of this function is therefore necessary to the continuance of life, since the nutrition of the tissues depends wholly on the materials thus supplied; and the constant stimulus of the vital fluid is necessary to excite them to the performance of their appropriate actions."

Dr. Carpenter has adopted the opinion that the ascent of the sap is by the woody fibre and dotted ducts (vasiform tissue) of the alburnum. DeCandolle and others, however, are of opinion that it passes through the intercellulary passages of the cellular matter around the fibre and ducts, that the cells separate to allow of the passage (the fluid not passing through them as imagined by some) and again close when it has passed, acting like the valves of the veins in animals, and assisting in the ascent. The sap, on examination, has sometimes, especially during the greatest ascent in spring, been found in the ducts; but this may have arisen from the wound made, or from the excess of sap at peculiar periods. They are generally found to contain air; and, like other modifications of spiral vessels, this is probably their destined function. Changes are supposed to take place and continue in the sap so soon as it enters the plant; and though these may be partly produced by the vital nature of the membranes it passes, or of the descending sap it is mixed with, they are likely to be more promoted by aeration than any thing else, and the sap probably passes principally along the ducts for that purpose. Like insects, plants are pierced with air-vessels in all directions, in the leaves, flowers, and young shoots; the spiral vessels communicating with the stomata perform the function of aeration in its most perfect form, which is by permeation in plants, the spiral vessels being closed at the ends, not in a continuous tube like the tracheæ of insects. The stomata are always connected with vessels; some say their number is determined by them. In exogenous trees the function is probably continued through the whole trunk by the dotted ducts, which, it is likely, serve the same purpose as the spiral vessels interspersed through the wood of endogenous trees. It must be evident that the spiral vessels interspersed through the trunks of the latter are intended for the purpose of aeration; the wood is also more sparingly furnished with vasiform tissue, the whole bundle of vessels being by many considered as ducts.

It is not likely that the more perfect exogenous stem would be without an aerating apparatus also; and the dotted ducts, from their great abundance and being more open at the ends, are probably the vessels destined for that purpose. They have been reckoned cellular, not vascular, by some, though others consider them vascular; but it is not easy to point out the limit between cells and vessels, and their lengthened form and dotted sides seem to indicate a vascular nature. When they are wanting, as in pines, their place is probably supplied by the large glandular tubes of the woody fibre. The apparent necessity also for an apparatus of the kind would seem to point out their office. The necessity of oxygen to stimulate the vital fluid, though not so great in plants as in animals, is yet found to be indispensable, no plant thriving unless both the air and water of the soil contain it; stagnant air and stagnant water being injurious to both leaves and roots. Other gases are probably introduced by the same means. In the higher animals, the aeration being confined to the lungs, there is more necessity for the fluids being returned, and a greater circulating power is required. In plants, where the vital force is principally confined to the young shoots, the aerating system is more perfect there; but, being perforated like insects with air-vessels which aerate through the whole extent of the young tissue, the sap circulating through the nutrient vessels is not returned again in such quantity to the leaves as the blood to the lungs. Throughout the whole circulation, however, there is a mixture of descending and ascending sap. The circulation in insects is also so feeble that it was at one time denied to exist.

On *Circulation in Vegetables,* he says:—"In the lower algæ, entirely *cellular* in their structure, there appears so little communication between the parts, that if a portion be suspended out of the water it will die, while the portion immersed continues to live. Among lichens or wherever there is an approach to a stem, the cellules are found to elongate. In mushrooms the nutriment received by the radical fibres at the base of the stem is transmitted by its elongated cells, and probably by the *intercellulary spaces,* to the expansion on its summit, where it is diffused in every direction. In the classes where a complete stem is developed with radical fibres and veined leaves, the cellular tissue of the stem and veins of the leaves is elongated so as to resemble fibro-vascular tissue; and there can be no doubt the circulation is through this channel, as stomata have lately been found on them. It appears that where there is no tendency to prolongation in a particular direction, the round vesicles of cellular plants transmit fluid with equal readiness towards all sides; but, wherever the function of absorption begins to be restricted to part of the surface, there is a tendency to elongation of the cells in the direction in which fluid is conveyed.

"In *Phanerogàmia*, the annual layer consists of dotted ducts and woody fibre, mixed with cellular tissue; the vessels at the inner side of the ring, and the fibres external. In long slender stems requiring rapid circulation, as the vine, and in dense stems, as oak, mahogany, &c.,. which do not transmit so readily, the vessels are largest in diameter. In the bark the cellular matter predominates over the fibro-vascular; there are also more intercellular spaces or passages than in the stem, as well as those branching and anastomosing tubes, which appear destined to the conveyance of elaborated sap, termed *laticiferous* vessels. The footstalk of each leaf is connected with the wood and bark, the upper stratum of vessels in the leaf and stalk being connected with the wood, and the inferior with the bark. These surfaces remain distinct while the leaf continues, their functions being importantly different.

"The course taken by the sap is the following. The fluid absorbed by the roots is conveyed upwards through the stem, by the woody fibre and ducts of the alburnum, to the upper surface of the leaf. Much of the watery portion is then exhaled, and an interchange of gaseous ingredients takes place with the atmosphere, by which a large quantity of carbon is added. The fluid transmitted along the inferior stratum of vessels to the bark contains the peculiar secretions of the plant, and is adapted to supply the demands of its nutritive functions. This fluid, now termed elaborated sap, proper juice, or latex, descends through the cellular tissue and intercellular passages of the bark, furnishing the materials of the new layers which are being added to the alburnum and inner bark; and a portion is carried to the interior of the stem by the medullary rays. Very little reaches the roots, and none, unless the small quantity which mixes with the ascending sap, is again sent through the system.

"The movement of the elaborated sap in its proper vessels has recently been made the subject of much careful observation. Schultz, who first noticed it in plants with milky juices, thought it peculiar to them; but there is now good reason to believe that it is common to all vascular plants. The channels are not straight tubes like the ducts in which the sap ascends, but of irregular shape, slender, and inosculate freely with one another like the *capillaries* of animals. They are arranged like the network of passages in many of the lower animals, as Planàriæ, which have no central organ of impulsion. The movement had been termed *cyclosis*, to distinguish it from the rotatory nutritive movement observed in single cells. It may be observed in thin slices of the bark under the microscope, the stipules of *F*ìcus elástica, the leaves and valves of the fruit of *C*helidònium màjus, or the interior sepals of Calystègia sèpium. It seems to take place in all directions, the currents often contrariwise in contiguous vessels. Sometimes one of the currents oscillates and stops, and either the same is recommenced or a new current in the same direction. It is owing to this variety in the course of the streams, that, if a stem containing milky juice be cut across in two places, the latter will flow out from both ends of the piece so isolated; and, as the same takes place in species which have a transparent proper juice, it is reasonable to infer that a similar circulation takes place in them.

" The cause of the ascent of the sap has long been disputed, some attributing it to mechanical, and others to vital inexplicable, influences. The endosmose of the roots is a partial, but not the entire, cause of the ascent, since it only continues provided the functions of the leaves occasion a demand for it. The upward flow of sap in the spring begins near the buds, and may be progressively observed to extend to the branches, trunk, and roots, the latter not commencing their action until the superincumbent column has been removed. The demand for fluid occasioned by the vital processes of the leaves is the cause of the ascent, the propulsive power of the roots raising it to the power of that influence. The cause of the descent cannot be distinctly ascertained; it has been supposed partly due to gravity, but, though affected by it, cannot depend on it, as it takes place in pendent branches and bent stems. It is assisted also by vibrations of the wind. The descending may be called *vital circulation* to distinguish it from the ascending movement of crude sap. It is quite certain that it is independent of any contraction of vessels, and that it is closely connected with the activity of the nutritive principles. The analogy of the cyclosis of Schultz with the capillary circulation of animals has been already noticed; the latex is most abundant in parts in progress of developement, and the movement is much influenced by temperature. The cause of the movement appears to be a new set of attractions and repulsions, created between the particles of the fluid and the walls of the vessels through which they move, by the changes to which both are subjected in the process of nutrition. The obvious independence of the cyclosis on any thing like a central organ of impulsion supports the belief that the capillary circulation is maintained in the lower animals, and modified in the higher, by influences originating in itself, and is never entirely dependent on the action of the heart.

In the embryo the absorption takes place through the whole surface; there is no transmission of fluid, nor any vascular structure ; and it is therefore on a level, as to circulation, with the simplest cellular tribes. It is not until the true leaves are expanded that we find a distinct formation of woody or vascular structure. It is very interesting to remark that the ducts of young plants often present the appearance of those of ferns, having the spiral fibre disposed within them, and afterwards are converted into dotted ducts; showing that these are often formed upon the type of a spiral vessel, and reconciling the conflicting accounts of some who maintain they are of vascular, and others that they are of cellular, structure."

DeCandolle, in his *Vegetable Physiology,* says some consider life or excitability to be diffused through the organs, cells, and vessels; many that it exists in the vessels only; but he himself is of opinion that it exists principally, if not wholly, in the cells. Life can be carried on without vessels, while it is never done without cells. It is now found, he says, that the vessels, once supposed contractile and to carry sap, convey air only; and that in most cases the sap ascends by the intercellulary ducts; the supposed peristaltic motion of the vessels of Saussure being now ascribed to the cellular tissue; it is, therefore, the contractile force of the cells which causes the motion of the sap. The contractile force in cells is, he says, a modification of the systole and diastole of the heart, causing the emission of milky fluids when the cells are irritated, and the emission of the same from both ends of a piece of the stem, Humboldt having found it did not flow from pieces of the stem of euphorbia killed by electricity. The vital vessels of Schultz, which contain milky juices, are, he says, cells, and possess great contractility. Also, when plants are killed by poisons, the cells are found destroyed, while the vessels are often unhurt. The dotted ducts he denominates elongated cellules; but, as neither these nor the tubes have valves, as in animal veins, they are not fitted for the ascent of the sap; and as the sap would circulate through the cells with difficulty, it must take place, he says, through the intercellulary passages, principally along the woody fibre. The cells contract to allow the sap to ascend, and again expand and act as valves in maintaining what has ascended. M. Bischoff, he says, in experimenting with coloured solutions, found the colour to infuse into the vessels when the water was boiled, but, when the water contained air, the vessels were filled with the air and did not admit the colour. Mr. Knight was once of opinion that the ascent took place through the alburnous tubes: but, having found them full of air alone when the sap was rising briskly, he experimented by stopping the alburnous tubes and vessels; and, still finding the coloured infusions to rise, he concluded that the sap moved through the cells of the cellular matter, but that, when a great flow of sap takes place, it may permeate the walls of the tubes and vessels, which, though usually containing air, appear thus filled with sap.* In extracting for examining also, the wounds may cause them to be filled. A great assistant in the ascent, he thought, was the alternate contraction and dilatation of the so-called medullary rays, which he proved by experiments were formed from the bark, when all connexion with the medulla was cut off by hardening the alburnum. The office of the true medulla he conceived to be to assist in nourishing the young leaves on the annual shoot. The action of the rays, which he called silver grain, he thought greatly assisted by heat: when the top of a vine inside was excited, the roots outside were found to empty a bottle of water; while other roots with the stem outside, and not excited, did not take up any water in a bottle attached to them. In the *Library of Useful Knowledge* it is said: "It is not to be doubted the sap ascends by the woody tissue, but whether through the tubes of woody fibre, or by the intercellular passages, has not been, and probably cannot be, decided. The dotted ducts and tubes appear to have fluid when the sap is most rapidly flowing in spring, but it is equally certain that the dotted ducts, at least, are empty afterwards. Are we to conclude that they perform one office in spring, and another afterwards; or are the appearances of being filled with fluid in the spring owing to the overflow of sap into them when cut through? There is no satisfactory answer as to this yet on record." The endosmose power of absorption, assisted by evaporation, and descent of the thickened sap from the leaves, the editor thinks the cause of ascent. Some who experimented with coloured solutions found, if the water contained air, the vessels contained no colour; if the water were boiled, the colour entered the vessels, because there was no air to fill them in the water.

The subject appears beset with difficulties. The course of the ascent is by all allowed to be most rapid and powerful along the bundles of tubes and ducts in the centre. DeCandolle describes the woody fibre as intermixed and surrounded with ducts; these bundles of fibro-vascular tissue are likely to assist the ascent by capillary attraction, as the threads of the wick of a candle or lamp feed the flame. Nature is not confined to one power in its movements; there may be many assistants in the ascent. The ascent of fluids around cells can never be so direct or forcible as along longitudinal tubes lying in one direction. The first appearance of the rise of sap is always seen in the centre, in young spongioles and annual shoots; and the principal direction, and greatest force of the ascent, are undoubtedly always along the fibro-vascular tissue, though probably not confined to it. If the tubes and ducts are air-vessels, which they appear to be, the stimulus of oxygen is likely to assist in the ascent. The normal destination of the woody fibre seems to be, like the bones of animals, to strengthen and solidify the system; their toughness and straitened diameter do not fit them well for absorption and conveyance rapidly: that of the ducts seems to be air-vessels, their vascular structure being generally allowed. Independently of the experiments of Mr. Knight, which would seem decisively to point out that they do not generally carry sap, the lengthened tubes and ducts do not seem so capable of producing the phenomena of endosmose as cells and intercellular passages. If we confine the power of ascent to endosmose, and dismiss capillary attraction, stimulus of air-vessels, and excitability, the ascent would be most likely principally through the cellular tissue, which does not appear to be the case. The contractile power of the tissue of vegetables, when excited by sap and its motions, seems generally allowed, and is very probably a main agent in the ascent, assisted by the endosmose power of absorption, capillary attraction, and the stimulus of the air-vessels. It is a vital power which probably exists in all organised beings; it is concentrated in the higher animals, as well as diffused; but diffused only in the lower animals and plants, and will be greatly promoted by heat, as ascent of sap is found to be. Larger air-vessels are probably needed in such rapid circulation as that of the vine; and the impenetrable dense system of the oak, &c.; and the larger glandular tubes of pines seem to fit them as substitutes for ducts. The spaces found between the cells, ducts, and fibres are likely to be the main channel, if contractile force is the main agent; if endosmose is the main power, then the cells and spaces adjoining the tubes and ducts are most likely to be the channels, probably the cells principally.

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* The many experiments of Mr. Knight are so carefully executed, and so simply and lucidly explained in his Physiological Papers lately published, that they greatly assist in obtaining a *practical* knowledge of Vegetable Physiology.

On the descent and circulation of the sap, Mr. Knight thought the course of descent to be by the proper vessels through the bark to the roots, giving off the elaborated sap in its descent to form the new layers of alburnum and liber, and communicating by the medullary processes and intercellulary passages with the interior of the stem. Gravitation and vibration he considered great helps to descent, as he found the free parts of trees, partly tied for experiment, to thicken much more in diameter than the parts kept from moving; but, as the elaborated sap must proceed upwards in inverted cuttings and pendent branches, he considered the principal force to reside in the vital action of the proper vessels themselves. Mr. Niven says that, in a stem of elm tree, excavated in the centre, and left standing on pillars of bark and alburnous wood, for experiment, he found the first appearance of descending sap in the pith and the layers of wood near it, before it appeared in the bark, and before the leaves were out. He also found it continue to descend in other trees, though imperfectly, when the bark and alburnum to a considerable depth had been removed for experiment; thus showing that the whole wood partakes, though imperfectly, in the descent; the trees getting sickly after this experiment. Professor Thomson says both ascent and descent are assisted by the contractile power of tissue, which is stimulated to action by the sap. The proper vessels by which it descends are, he says, intercellulary passages, and by these also it ascends. Camphor, it is said, has been found to stimulate and increase growth. DeCandolle thought the course of the descending sap by the intercellular passages also; that it was by open vessels he thought proved by the fact that the under side of horizontal branches is always thickest, which would not be the case if by closed vessels. Sap generally, he asserts, follows the course of fibres either in ascent or descent most readily, though not wholly or always. Contractility, he says, is the cause of all internal force in the circulation of juices. Young incipient ovules, by their contractile force, cause the sap to deviate and be drawn to themselves. It is this also which opens and shuts the valves of stomata, forcing the water out contrary to endosmose and capillarity. It forces the sap upwards in drooping pistils and pendent branches. It is also this, he says, which causes the circulation in the cells of Chàra, &c., and in the laticiferous vessels of Schultz, which resemble cells in texture. Müller says there is an attraction between the blood-vessels and blood in the capillaries, as it sometimes causes accumulation, but does not see how it can cause circulation; he does not take notice of repulsion. The force of circulation in the capillaries he thinks wholly dependent on the action of the heart. Circulation in Diplozòon and other Entozòa, Ehrenberg discovered to be by vibratory ciliæ, and the same in detached parts. In Planàriæ, Echinodérmata and other low animals, the motion of the blood is, he says, effected by one or more contractile vessels. In Annélida the contractile organs which give rise to the motion of the blood are situated at different points of the circle; in some the dorsal vessel acts the part of the systemic heart. At page 42. he says, the motions of stamens, leaf-stalks, &c., have too much resemblance to the irritability of muscles, not to be compared with it. At page 43., he says, plants possess irritability, not sensibility, which is consciousness. In the *Library of Useful Knowledge* it is said, different portions of the elaborated sap probably descend by different directions, partly by the fibres of the bark, and partly by the cellular portion of it, and along the medullary rays, the force which carries along this last not being defined.

Gravity and vibration are causes of descent that are obvious and easily understood; vibration probably assists, as I before noticed, in the removal of unsound particles, and may help in this way to consolidate. Plants exposed to the action of moderate winds are always more firm, healthy, and vigorous than those confined. The assistance of gravitation in descent is seen in the fact that all branches have their vigour much lessened when depressed artificially in training, and the tendency of the branch to start a shoot in the vertical direction from the upper part of the bend. Most writers seem to acknowledge the necessity of an internal vital force; and the most obvious and most generally referred to is that of a contractility, similar, though of a lower kind, to the contractility of the heart. Dr. Carpenter does not say how it is certain that it is independent of contractility of *vessels.* DeCandolle says that, though general through all the tissues, the contractile force principally resides in the *cells.* The force, which he describes, of attraction between the nutriment and the walls of the vessels or cells through which it moves, is generally allowed, but can be no more explained than other vital actions. That of repulsion has not been so generally allowed; and how the same substances that once attracted will repulse, cannot be understood unless from some chemical changes giving rise to opposite states of electricity. It is noticed that a current of electricity, conducted along the laticiferous tubes, stops the circulation. The power of contractility has been said to be elicited by electricity; and the two powers may be the same under different names. The course of the downward flow seems most likely to be through the intercellular passages, and most forcibly along the fibro-vascular portion of the bark, and along the fibres and ducts of the liber, as along those of the alburnum in ascending. It is highly probable also that networks of capillary vessels or tubes exist, and may assist in carrying off waste as well as depositing. The oxygen of the air may be united to insufficient particles in the young soft wood, or the newly deposited layers of the old; and they may be absorbed and carried off by vessels similar to the laticiferous, but would require to be situated in, or connected with, the alburnum as well as bark. The constant extrication of carbonic acid from the stomata would seem to infer a necessity for something of the kind; and the circumstance of unsound portions being seldom found in healthy well-ripened young wood, and being sometimes found partly to disappear from very young shoots by the further growth of the same season, is also favourable to the opinion. If shoots kept from moving were found to give off less carbonic acid than those kept in a vibratory motion, it would tend to confirm this opinion. Old wood, being comparatively inert, could have no share in such a process.

A great deal of action undoubtedly takes place in the leaf; plants requiring to prepare organic compounds from their elements principally, or wholly, require greater chemical power to assist organic action. From the similarity between organic action and chemical, and from chemistry being able to imitate some organic actions, it has been assumed by some that the whole action taking place there is chemical; and it has been customary to talk of the peculiar secretions as prepared there, and sent down the channels of conveyance in a prepared state. It is more likely, however, that, as in animals, the elaborated sap of the plant, like the blood of the animal, contains only matter capable of enabling the secreting and assimilating organs to prepare their several products, each in its own way. The sap has not yet been analysed at its outset from the leaf, so as to show whether it contains the peculiar secretions in a prepared state, or only the proximate principles necessary to enable the organs to perform their functions, which is more likely. The action is also probably as much organical as chemical, though it will be difficult to define between these; yet the chemical power of light cannot separate carbonic acid, water, and ammonia into their elements, without the organic action of the leaf, in the same manner as it does by its assistance; and, though the leaf cannot perform its action without the assistance of the light, the latter may perhaps act greatly by stimulating the organic action of the leaf, as well as by its chemical powers. The full intense white light of the sun is necessary to produce perfect action; the blue rays are the most indispensable, showing the chemical power resident in them to be the most necessary; but they must have organic assistance, and are most efficient when combined with all the rays into the perfect sunbeam.

The laticiferous vessels cannot be the main channel of the returning sap, as they do not contain fluids capable of supplying the wants of the nutritive or assimilating organs. According to the analysis given by Professor Thomson of the milky juices (*Vegetable Chemistry*, p. 792, 793.), they abound mostly, besides water 73 to 77 per cent, in fixed oils, resins, caoutchouc, and cerin and myricin, the constituents of bees' wax; all substances containing a superabundance of hydrogen, unfitting them for assimilation, independently of their being in a state requiring decomposition before becoming nutritive, for which there is no apparent reason: of nitrogen, an indispensable requisite, they contain only a trace. It is clear, therefore, that the fluids circulating in the laticiferous vessels are unfit for the general nutrition of the plant; and, as these have been denominated latex and peculiar juices, that either of these terms is improper and insufficient, when applied to mean the elaborated sap, proper juice, or nutritive fluid of plants, which they have too generally been. It is clear, also, if we adopt the idea, that the nutritive fluids, capable of serving the general purposes of the plant, circulate through such capillary vessels, then there must be other similar vessels in these plants containing those nutritive fluids, which may hereafter be found to be the case. The nutritive fluid must contain carbon, hydrogen, and oxygen, in something near the proportions required to form the system in general; to which mucilage seems to be the nearest approximation of any of the organisable or proximate products. It must also contain nitrogen, indispensable in the formation of all new matter, besides being assimilated by many of the organs; this may be in the state of fibrin or gluten, so easily separated from the vegetable juices, or in the state of *proteine*, the basis of fibrin or gluten, albumen, and caseine, which differ only in their saline earthy ingredients. The nutritive fluid must also contain the saline earthy ingredients required for so many of the organic products. The cambium, the main product of the elaborated sap, is principally composed of mucilage. The mucilaginous juices have not been so much submitted to analysis as the milky juices; but the analysis of mucilage of lintseed, given *Vegetable Chemistry*, p. 674., shows their fitness for the purposes of general nutrition. It contains, besides 7·11 per cent of ashes of saline matter, the following proportions of organic, viz.: —

Carbon - - -	34·30
Hydrogen - - -	5·65
Oxygen - - -	52·78
Nitrogen - - -	7·27
	100

The excess of hydrogen and oxygen above carbon is owing to the mucilage containing 10 per cent of water, which is probably contained in tissue in a free state. Müller says all the animal tissues contain $\frac{4}{5}$ of water in a free state, and, if this be pressed out, they cannot live. Seeds also contain free water, and, if this be dried up, they die. Water seems necessary to preserve the capability of living in the tissue.

From juices of this description the general products of the system might be formed; and if mucilaginous juices similar to the above are found by subsequent observation to circulate in masses of capillary vessels similar to the laticiferous, and in sufficient quantity to furnish a channel for the general current, we may then adopt the opinion that the general circulation passes through vessels of this description. If not, we must resort to the old opinion, that such products are peculiar secretions circulating in peculiar vessels, and not the general channel of circulation as supposed by Dr. Carpenter.

Besides the assistance of gravitation, vibration, contractility, and attraction and repulsion, in the descent and course of the elaborated sap down the bark and along the medullary rays, and perhaps also in masses of smaller vessels, to furnish the nutriment needed for the different parts of the system, the power of endosmose is an assistant in the circulation, in such as the bursting of anthers, capsules, &c., and generally wherever thinner fluids are attracted to the more dense. If it is correct, as stated, that endosmose often takes place from thicker to thinner fluids, it may be found more general than supposed through the circulation. If due to electricity, it may also be found that the same electricity which produces the elective affinity of the physical causes, may likewise be concerned, by acting on the excitability of the membrane, in causing the much greater power of endosmose through organised membrane, than through porous inorganic septa, which is found to take place.

In Chap. VII., *On Interstitial Absorption*, he says:—"The circulating system not only serves to convey to the remoter parts of the organism the materials required for the nutrition of their tissues, but in the lower animals returns to the central reservoir the portion which has not been so employed, and those particles of the solid structure which, from tendency to decompose or other causes, are unfit to be retained in it. In the Vertebràta, which possess a special set of vessels for the absorption of chyle from the intestines, allowing the portion not absorbed to pass on and be rejected, we find also a system of tubes ramifying through every part, to which the function of absorption seems more particularly delegated. The *lymphatics*, as they are termed, are distributed through almost every tissue in the body; they are especially abundant beneath the skin, forming a close network so universally diffused, that, if successfully injected, it is scarcely possible to find a spot not traversed by them. They commence, like the lacteals, without open extremities, deriving their contents by imbibition or endosmose from the surrounding tissue; they unite into large trunks, and by these the fluid taken up by the absorbent extremities is conveyed to the principal veins. The cause of motion in the lymphatics, besides the endosmose one of absorption, is probably peristaltic, by which their fluids are propelled forward, the reflux being prevented by the valves with which they are plentifully supplied. The veins themselves, in many cases, participate in the function of absorption more actively than the lymphatics." The lymph taken up in this way is said to be nearly identical with the fluid portion of the blood, or serum, containing the portion called *serosity*, supposed to consist partly of effete particles, furnishing the matter excreted by the kidneys, &c. The waste of the system is supposed to be taken up by these means and conveyed into the circulation, where part of the carbon is oxidised and given off in respiration; part of the carbon and hydrogen of the waste, and the non-azotised portions of the food, being separated by the liver to form bile, which, after assisting in forming the chyme into chyle, is partly excreted with the matter of the food rejected (Liebig says all the waste of the body and non-azotised parts of the food pass through the liver). The nitrogen and saline earthy substances of the waste are carried off and excreted by the kidneys. These matters, belonging to Animal Physiology, are foreign to the objects of our present essay, were it not for the presumption they afford, that something of the kind may yet be found to exist in plants.

(To be continued.)

Art. II. *Dinbur Castle, its Gardens and its Gardeners.* By Peter Mackenzie.

(Continued from p. 416.)

In the explanatory introduction to the natural arrangement of your *Hortus Britannicus*, you have given directions how gardeners may know the quantity of ground required in the formation of arboretums or herbaceous grounds; and, after giving directions how to find the square root of all the smaller squares which would contain all the hardy herbaceous plants of a tribe or order, you say that "every gardener knows, or ought to know, how to modify this square to a parallelogram, a triangle, or a circle, of the same capacity." I believe that there are too many gardeners deficient of much knowledge which they ought to be in possession of; and, perhaps, among the various branches of the tree of knowledge, that of practical geometry is not cultivated to the extent which it ought to be. There are some to be found who would have some difficulty in telling the number of square feet or square yards that may be in their onion beds, although they may be in squares or parallelograms. Perhaps geometry was more studied by gardeners and foresters a hundred and twenty years ago than it is at the present day. Although many of the young men employed in gardens may have had a tolerable education before they commenced working, there are few of them who have studied the first properties of the circle; or, a circle being given, to inscribe in it, or describe about it, an equilateral triangle, a square, a regular pentagon, or a regular pentadecagon: neither have they studied the many useful things that are performed by means of the triangle, or made themselves familiar with the different measuring units employed in the various subjects of measurement. Perhaps it may be of little use to them to be acquainted with the measuring unit of the astronomer, or the square mile of the geographer; but it will be of great use to them to be acquainted with the measuring units of the land-surveyor, the carpenter, the glazier, the mason, and bricklayer. It sometimes happens that gardeners are required to measure artificer's work, and they sometimes look awkward enough when they cannot do it. It was not a bad thing in some of the old works on gardening, to have a chapter giving directions how to measure, divide, and lay out land: for, although there are many books on the subject to be had, yet many journeymen gardeners may be without them; and, though it may be a simple thing to measure a square, a parallelogram, or a triangle, or to raise a perpendicular, or draw an oval figure, yet there are not a few who may be looked upon as good gardeners, who would perhaps find some difficulty in doing them properly, when it was required of them to do them. I speak from what I have seen in royal gardens and downwards. There are few gardeners but have some works on gardening, and, if a few simple directions were given how to measure geometrical figures in some part of the book, it might assist them greatly at times. But, towards acquiring a knowledge of the superficial or solid contents of bodies, nothing is equal to the doing of the thing; an hour's practice is worth many hours' study with books.

The gardener of Dinbur Castle was well aware of the advantages that were gained by active perseverance after knowledge, and he wished to impart to his men such information as would be useful to them; he was destitute of that narrow-minded imbecility which will not communicate with other minds which are reckoned beneath him; he believed that the more useful knowledge was disseminated, the probability would be greater of having physical obscurities dispelled, and, though one failed in accomplishing the object of his desire, others might be successful in discovering some of the inexhaustible fountains of knowledge which a bountiful Creator has placed within the reach of finite minds to open.

One evening in summer when the labours of the day were past, when the lads in the bothy had partaken of their evening meal, and had rested themselves a little, their master came among them with his measuring-chain and cross-staff, picket staves, and arrows. He soon told them that the object of his visit was to give them a few lessons in land-surveying, and, though it was upon their own time, he hoped they would give him their attendance for a few hours, for he trusted it would be to their own advantage in after life, when they would have charges of their own. All showed their readiness to attend their master. They went into a pasture field, where they were to commence operations, and, although some of them knew a little of land-surveying already, yet he thought it would be as well to give them a few instructions relating to the geometrical figures in which pieces of land are commonly found to be; so, instead of giving his lessons on paper, which is a common practice, he marked off with his picket staves a large square, and showed that by multiplying the base side by the perpendicular, the number of square links, or feet, or yards, would be found. After Bauldy had understood how to find the contents of a square, he next formed a parallelogram, and showed that the area is found by multiplying the length by the breadth. He next formed the rhombus, and directed them to multiply the base by the perpendicular height, and they would find the area: he also showed them the difference between the rhombus, and the rhomboides from the rhombus. He proceeded to the triangle, and showed them various ways of finding the area; first, by multiplying the base by a perpendicular demitted from the opposite angle, half the product is the area; or, by multiplying the base by half of the perpendicular, or the perpendicular by half of the base. After the triangle he formed the trapezium, and, dividing it into two equal parts by a diagonal line, and demitting perpendiculars from the other angles and multiplying the diagonals by the sum of the two perpendiculars, showed them that half the product is equal to the area. Next in order he described the trapezoid, the regular polygon, the circle, circular ring, segment of a circle, and the ellipse.

Having gone over the various forms in which the different parts of our earth are commonly found, or a combination of them, he found that he had not time to measure the fields which he intended. The sun was descending towards the highland mountains, and the long shadows of the evening were gathering around them, so it was agreed that they should draw their operations to a close, and resume them again at an early opportunity.

When they were leaving the field the attention of Bauldy appeared to be fixed upon a beautiful Lombardy poplar that was growing near the place where they were. At last he said, "Weel master, I hae aften wondered what the hight o' that tree may be, but I dinna ken how to reach the top o't." — "But you may soon know the height of it, Archibald, without going to the top of it," replied his master. "The sun has not yet set, and the shadow of the tree is very distinctly seen upon the field, so that the length of the tree's shadow may be easily known." He knew the length of one of his picket staves, and measured its shadow and also the shadow of the Lombardy poplar; he applied the rule of three to the three given numbers, and in a few minutes he told Bauldy that the height of the tree was about 70 ft. Bauldy thanked his master for the information he had given him, and added that it was "a braw thing to hae lair, for it made them that made a gude use o't like a different set o' folk althegither." — "I am glad to see you, Archibald," said the master, "so desirous to obtain useful acquirements, and

I hope the instructions you receive in the bothy will not be lost upon you." — "My mind," replied Bauldy, "when I came to wark with you, was something like the wild brier that ye braught frae the wood, that braught forth naething but single roses and dog-hips; but ye planted it in the garden, and ye put bud after bud upon it, and noo it bears beautiful roses o' the Aurora, and the Elysian, and Isabella, and Amaranth, and Rosinella: and every lesson that I receive I try to bud it in my mind, and few o' them dies; and when I get the name of a plant frae Sandy, or a lesson in arithmetic frae Colin, or the name o' a stane or an insect frae Wattie, I try to mind them a', and I pay them back sometimes wi' a sang, or, when they hae laid aside their books for a night, I give them a tune on the fiddle, and I am glad when I can tell them something about music that they dinna ken." — "Well, well, get on with your knowledge and your friendships," said their master, "and may ye all be happy! So good night with you all; I hope we shall soon meet again."

West Plean, Sept. 14. 1843.

(*To be continued.*)

Art. III. *Notes made during a Horticultural Tour from Lowther Castle in Cumberland to Exeter in Devonshire.* By J. Cruickshank, Gardener at Lowther Castle.

After calling at some of the small places at Sidmouth and its neighbourhood, where there is little else to be seen besides the beautiful scenery from the cliffs, and finding my time limited, I called to see the nurseries at Exeter, so fully described by you in p. 35. to 38. These far surpass what I expected them to be: I cannot pretend to give a description after you. I found the grounds in the very best order, and the plants in the best health. The propagating-house of Messrs. Veitch and Son is the finest thing of its kind I have ever seen. To these gentlemen I am indebted for their kind attention.

At the request of my kind employer, who wished me to see Tidworth (Thomas Ashton Smith, Esq.), I took the coach from Exeter to Andover, and I could not help remarking to the guard that it was certainly coaching in the olden time. We left Exeter at 5 o'clock in the afternoon, and reached Andover at a quarter to 7 the next morning. The coachmen and guards in that part of the country seem never to have heard of Croals's (of Edinburgh) patent drag, which does not lose time in putting on the skid. I was quite delighted with the country, with its beautiful little hills and dales, and was sorry when night came on. I could not but think, when we got near Salisbury, what a contrast between the small fields of the

Devonshire farmers, looking like a piece of patchwork, and those of the Wiltshire and Hampshire farmers. The hedges in Devonshire are the worst I have ever seen; and in their implements of labour, waggons, carts, wheelbarrows, spades, horse-harness, ploughs, &c., they are many years behind us. How a ploughman from the North would be surprised to see them struggling to get along with three, or sometimes four, horses; so badly managed, that it appeared to me as though the horses pulled in turn: as much as to say, I pulled last time, you must pull this! I saw, when walking with Mr. Barnes in the neighbourhood of Bicton, four heavy oxen yoked to one plough in the most primitive way I know, with wooden hames over their necks; the two leaders pulling by a chain. As might be expected, when turning at the ends, they got their feet over the chain; and then, of course, they came to a stand-still, until the assistant boy or man got it put to rights again. I found it was of no use to try to persuade the person in charge of the plough that two of his oxen were quite equal to do the work better and quicker, in that beautiful sandy loam, than four.

Tidworth. — The house is situated in a bottom. It is a plain substantial-looking building; and would, I think, have looked much better had it been built on the rising ground behind it. There is a good architectural conservatory joined to the house.

The plants are very well grown, very clean, and there was a very good show of flowers, of the commoner sorts of green-house plants.

There is an extensive flower-garden, in the very highest order and keeping; well filled with flowers, and much enlarged since Mr. Saunders has been there: if I recollect properly, it has been relaid out by him.

The kitchen-garden is large, and is kept in excellent order. There are five vineries with excellent grapes. One house is entirely planted with muscats of different sorts. The vines are planted in a pit in the middle of the house; and, for the time they have been planted, I never saw vines doing better, both as regards a beautiful crop of grapes and the wood for another season, which is both short-jointed and vigorous, and bids well for a splendid crop next year. The vineries are each 40 ft. long by 15 ft. wide. There are two good pine stoves 40 ft. long by 15 ft. wide. The pines are well grown. There were some very good fruit at the time I visited the place. Mr. Smith told me himself that he had three pines on his table at one time, last June, that weighed two stone. He walked round the gardens with me himself, and through all his houses, stables, &c. He seems to take a great delight in his forcing-houses, stables, and dog-kennels.

There are also two peach houses 40 ft. long by 15 ft. wide. The peaches were nearly over when I was there; but, from the state of the trees, they appeared to have borne an excellent crop.

There is a house built here, of the most extraordinary dimensions, for the purpose for which it was built, that I have ever seen. It covers a quarter of an acre and eight square yards of ground; 303 ft. long by 23 ft. wide, with a span roof, glass ends, and front sashes nearly to the level of the ground, and it contains 14,978 ft. of glass. There are large folding-doors at each end. There is a gravel walk down the centre of this house, wide enough for a lady to drive her carriage and turn round at each end of the house without going out of it, or in the centre, as may be convenient. The house is heated by hot water, and fitted up with stages sloping from each side; a trelliswork is fitted up all round the front and ends, and an immense quantity of peas and strawberries are forced in it with the greatest success; as Mr. Smith told me he had green peas every day, if he wanted them, from the middle of December until they came in out of doors, and strawberries from the middle of February until they were fit to gather in the open air. The stages are filled with small greenhouse plants, geraniums, cinerarias, bulbs, and other winter-flowering plants; and below the stages are grown seakale, rhubarb, asparagus, and salads of various descriptions, which afford an ample supply for the table. There are also trees budded at certain heights to suit the stages, such as cherries, plums, and apricots, the trees being planted in a border below the stage; but, as the roof is a fixture, they found they could not give the trees that rest which nature requires. I was glad to hear from Mr. Saunders that Mr. Smith is building a house 90 ft. long for forcing cherries, &c.; and that all the trees are about to be removed from the large house, which, in my opinion, will much improve it.

The stables, as might be expected, are good; each horse has an enclosed box by himself, as Mr. Smith allows none to be tied up.

There is also here one of the largest rides I have ever seen, for exercising horses in bad weather, covered in and kept in first-rate order.

The dog-kennels are good, and as clean as any place of the kind can be. The water which supplies these kennels, the house, and the gardens, is raised from a deep well on the top of the hill, by an engine of several horse-power. While looking at the kennels, I could not but contrast in my mind the splendid lodgings appropriated for Mr. Smith's dogs, and the miserable damp hovels, in back sheds, generally set apart for under-gardeners. But, in my opinion, the gardeners are much more to blame than their employers. I speak from experience when I state, I never had any difficulty in the situations I have held, on having the thing properly explained to my employers, of having proper places built for that purpose. When

I came here, between five and six years ago, His Lordship was kind enough to allow me to build proper places for the young men here, and at Whitehaven. Men in such situations have a right to expect protection and comfort from their masters. I am glad when I see men in a clean place, comfortable and happy; it is a great inducement to them to stop at home and study their business. I have been induced to say this much, having suffered from having to live in such miserable places as I never wish to see any young man in.

I was glad to see the spirited manner in which every department is carried on at Tidworth: there seems to be no want of help there. — *Lowther Castle Gardens, Oct.* 16. 1843.

Art. IV. *Descriptive Notice of some of the Gardens and Scenery around Stirling, the Strath of Monteith, and Strathearn.* By James Drummond, Gardener at Blair-Drummond.

INTRODUCTION.

When Mrs. Loudon and you were in Scotland, in 1841, you visited some of the noblemen's and gentlemen's seats in the neighbourhood of Stirling; but, as your time was very limited, and the weather very wet, you regretted that you could not do justice to your tour in that quarter, as you had to pass some of the places you wished to see, and others you only got a glimpse of.

I believe, some time ago, I promised to give you a descriptive notice of the gardens at Keir, the seat of Archibald Stirling, Esq., of which you gave but a very short notice in your interesting periodical, the *Gardener's Magazine.*

As there are a great many fine gardens and forest trees around Stirling, the Strath of Monteith, and Strathearn, I intend (if time and health permit me) to give you a short description of some of them, in the following order.

Keir Gardens, new pinetum, park, and some of the large trees. Kippinross Garden, a drawing of the brass plate on the large sycamore, measurement of other large trees, &c. Dunblane, the old cathedral, and other buildings. Holm Hill, Anchorfield, and Mr. Barty's select collection of plants. Returning down the left bank of the river Allan, by Kippenret Glen, I shall take notice of some rare plants to be found there, then pass on to Airthrey mineral wells. From the wells to Stirling Castle hill, taking notice of some of the plants to be found on the hill; leaving the Messrs. Drummond's nursery, and some of the gardens to the south-east of Stirling, till another opportunity.

Leaving the Castle hill, I will proceed south-west along the Touch and Campsie hills, having in this route, between the hills on the left hand and the river Forth on the right, Touch House, the fine cedar of Lebanon, Oriental plane, and other trees; Gargunnock House, garden, and large Spanish chestnut trees; Leckie House, garden, and fine Scotch fir trees; Bouquhan House, garden, and trees; Kippin village and churchyard; Arngomery House, the large yew tree and others.

After passing Arngomery, I will cross to the north side of the Forth by Cardros Bridge, take notice of the fine park, large trees, and beautiful grassy lawns and gardens at Cardros House; port of Monteith; the Loch islands, and religious building, now in ruins, also the fine large old Spanish chestnut, and other trees in the islands: then turning eastward, between the Forth on the right and the Teith on the left, take notice of the garden, the ponds, the fine park, and large transplanted trees at Rednock House; Lendrick Castle and parks; Deanston garden, and fine collection of showy border plants, and new greenhouse.

Taking a very short notice of Blair-Drummond, as you have been kind enough to notice it particularly in a previous Number of the *Gardener's Magazine*, I will cross the river Teith by the old bridge near Doune, and notice the village, the old castle, Cottage Garden Society, and the garden at Newton, and fine old trees in the vicinity of the old castle of Doune; Kilbride Castle, a little to the north-east, and Doune Lodge, a little to the north-west of Doune. I will then proceed westward, along the north bank of the Teith to Cambusmore, the Gart, and the village of Callander; then, entering the pass of Lenne, up Loch Lubnaig side, giving the girts of some fine large Scotch firs growing at the top of the loch. Then passing through Strathtyre to Loch Earn head, give a description of some of the scenery on both sides of the loch; Edinample Castle; Ardvorlich House and large thorn tree; St. Fillan's, at the foot of the loch; the scenery at Dundum, south side of the Earn; Dunira House, gardens, and fine range of hothouses and melon pits, on the north side of the Earn; Dalchonzie House and little paradise of a garden, on the south side of the Earn; Aberuchill Castle farther on, on the same side, with its straight, wide, and extensive avenues of large old trees.

Crossing the Earn by the bridge of Ross, to Comrie, I will give a short notice of that interesting village; Dunmore Hill, a little above the village, with the stately column of solid granite, erected in memory of Lord Melville, which surmounts it, and the impetuous, roaring, mountain stream which falls into the deep, dark, cauldron or horrible abyss which lurks among the shaggy rocks and coppice wood at its eastern base. Leaving the village of Comrie, I will proceed to Lawers House, and notice the garden, park, extensive avenues of stately trees, &c.; farther on, to Ochtentyre House, fine ponds, large trees, garden, and large laurels. Crossing to the south side of the Earn, I will give a short notice of Strowan House, &c. From Strowan House to Crieff, on the north side of the Earn; from Crieff to Fern-tower; Monzie, and the large larches; Culteque; Abercarney House and gardens; Millearn House, with its gardens and greenhouses; Gask House, garden, and large Spanish chestnut and other trees; Balgowan House, parks, and large cedar of Lebanon; Methven Castle, garden, &c.; Lyendoch Cottage garden; scenery on the river Amond, Bessy Bell's and Mary Gray's graves; Perth nurseries; Hill of Kinnoul; Hill of Moncrieff; Moncrieff House and gardens; Duplin Castle, garden, and large trees. After leaving Duplin, I will cross the Earn by the bridge of Forteviot to Invermay; then along the south side of the Earn to Duncrub; Auchterarder House; Strathallan Castle; Culdees Castle, and Drummond Castle; from Drummond Castle along the Crieff and Stirling road to Ardoch, and then from Ardoch to Stirling, &c. &c.

This route will, of course, occupy a series of letters; but having visited all the places above mentioned, and lived at, and in the neighbourhood of, some of them, and having measurements of a great many of the trees, and other notes regarding all or most of them, I shall, as the evenings are now getting long, have ample leisure and opportunity to engage in this delightful task. If you consider that my letters may be of any benefit to any of your readers, and worthy of a place in the *Gardener's Magazine*, their insertion will be ample compensation for my labour. I will take notice of the habitats of some of the most interesting of our Scottish plants as I go along. My next, if well, will be a visit to Keir Gardens.

Blair-Drummond Gardens, by Doune, Oct. 19. 1843.

Art. V. *A Classical Garden of the Mason School of Design, prevalent about the Middle of the last Century, exemplified in the Grounds of Stoke Park, near Windsor, the Seat of John Penn, Esq.* Communicated by Robert Osborn.

[The following communication has been in our possession since 1833; see our Vol. for that year, p. 529. We owe many apologies to Mr. Osborn for not having before published it. We have not engraved the very beautifully drawn map which accompanied the MS., because, to reduce it so as to come within our page, would render it of little use. We consider the description of great interest, as showing the style of laying out flower-gardens, and ornamenting them with statues, busts, inscriptions, &c., so strongly approved of by Mason the poet, and exemplified by him at Newnham-Courtnay, near Oxford, between 1770 and 1780. The present possessor of Stoke Park is Granville Penn, Esq., and under his direction the place has undergone some alterations, which are decided improvements. At this time, 1843, it is in excellent keeping.

In compliance with your request, I send you a little plan of Stoke Park (drawn by my son William), the seat of J. Penn, Esq., grandson of the celebrated Wm. Penn, the founder of Pennsylvania, and original proprietor of that province; but I am apprehensive that, being upon so small a scale, it will be of little use to you.

The park contains about 300 acres within the paling. It lies nearly due north from Windsor, and is distant from it four miles. To render this park what it is, the skill of artists of the first celebrity (Richmond, Brown, Repton, Wyatt, &c. &c.,) has been called in to aid in beautifying and adorning, and generally, it is allowed, with the happiest success; the architectural structures, the artificial rivers, and sylvans cenery, forming most picturesque and pleasing combinations.

The house is a large modern building composed of Grecian and Roman architecture, having four fronts. The south one, or garden front, commands a magnificent view of Windsor Castle; the forest, with St. Leonard's on the right, and the Surrey hills on the left. In this view (and the like may be said of all the rest), the boundary of the park is perfectly concealed, and the grouping of the trees so judiciously contrived, and made to blend so well with the intermediate and distant country, as to give these grounds the effect of indefinite extent.

The view from the east front (though not of that bold character as the former) is a much-admired vista, terminated by a swelling wood of dark pines at a distance of three miles, called Black Park, belonging to R. Harvey, Esq., giving fine relief to the monument erected in memory of Gray, a handsome stone sarcophagus on a lofty pedestal, with inscriptions in the panels of its four sides. In three of these are quotations from his works, and in the fourth the following memento: —

THIS MONUMENT,
IN HONOUR OF THOMAS GRAY,
WAS ERECTED A.D. 1799,
AMONG THE SCENES CELEBRATED BY THAT GREAT LYRIC AND ELEGIAC POET.
HE DIED JULY 30. 1771,
AND LIES UNNOTICED IN THE CHURCHYARD ADJOINING,
UNDER THE TOMBSTONE ON WHICH HE PIOUSLY AND PATHETICALLY
RECORDED THE INTERMENT OF HIS AUNT
AND LAMENTED MOTHER.

This spot is much resorted to by persons of taste, both on account of its beauty, as well as to contemplate those scenes which are supposed to have inspired the muse of Gray to compose some of the most beautiful of his poems. From here may be seen, at the east end of the church, under the window, the gravestone under which the mortal remains of the poet are "for ever laid." The picturesque chimneys, and a remnant of the old manor-house, the subject of Gray's "Long Story," is also seen a little to the right of the church. When seated on the plinth of this monument, and looking westward, the eye takes in, in beautiful succession, over beds of flowers in the foreground, the noble mansion at a distance; fine forms and masses of wood, producing great variety of light and shade; the church and churchyard; at a distance, in an opening in the park, a lofty column supporting the statue of Sir E. Coke; and the picturesque old mansion; the harmonising effect of these objects composing a finished picture. But to go back to the east front of the house; the bridge is a great ornament to this view, both from its position and its form, which is a small segment of a circle, with balustrades and three semicircular arches, the whole built of stone. The spire of the church, too, is an important object in this view, seen rising out of a mass of wood that "crowns the watery glade."

The north front, being that of approach, has but little to recommend it to notice, the whole space on this side the pales being very flat; and, although it is well wooded, yet there are a heaviness and formal squareness in the outlines ill adapted, in my opinion, to gratify the eye accustomed to view these things with taste and discrimination. The monotony, however, is somewhat relieved by a high wood at a distance, and also by the lofty Doric column (before noticed) supporting the statue of that great lawyer Sir Edward Coke, who died, at an advanced age, in the old manor-house.

Mr. Penn, some years ago, had designed to attempt an improvement in this part of his grounds, by excavating and raising mounds of earth, making breaks into the woods, &c. &c.; but the uncertainty of producing an effect commensurate with the magnitude and expense of the undertaking deterred him for the time from putting his plan in execution.

The flower-garden lies to the westward of the house, and is formed upon the plan presented to the reader of poetry by Mason, in the fourth book of his *English Garden*. A number of busts, upon terms of antique shape, are interspersed among trees and shrubs, each having an inscription upon a tablet in front, selected by Mr. Penn, mostly from the works of the author to which it is affixed; those of Latin, Greek, and Italian having, for the benefit of the unlearned in these languages, a translation upon a movable panel at the back, which lifts into view.

Upon first entering the garden, a walk of a considerable length, of an easy sweep, presents itself to view, leading out of which, a little way along to the right, is a recess containing about a quarter of an acre, ornamented by clumps of shrubs and flowers upon a fine turf, surrounded by a gravel walk, by the verge of which, appropriately placed, are the busts of Dante, Tasso, and Ariosto; and, centrally, a plain green-pedimented summer-house, in which are placed miniature busts of Montesquieu, Molière, Racine, Boileau, Corneille, Fénélon, Voltaire, and Rousseau; all, with the exception of the two last, being tastefully *embraced by branches of palm* in basso relievo. Returning again to the principal walk, the eye is directed to the busts of Horace and Mæcenas; and, next, to that of Mason, conspicuously placed; retiring behind which, by narrow walks through a thicket of shrubs, you are brought into a broad walk, which Mr. Penn has classically designated the "Peripatetic's walk." Bordering upon this, and other winding branches from it, are placed the busts of Cicero, Seneca, Socrates, Plato, Aristotle, and Zeno. Turning back, and proceeding along the principal walk, you are brought to the broad part of the garden, facing which, and commanding a view of Windsor Castle, is the Temple of Fancy, a Doric structure after the plan of the temple dedicated to the Muses on the banks of the Ilissus, containing a bust of Shakespeare. From here may be seen the busts of Anacreon, Pope, and Gray. A little further on, beneath the branches of a magnificent oak, Petrarch is placed.

We are now brought to the termination of the principal walk, meeting another at right angles, which, pursued a little to the right, brings us to a bust of Waller (appropriate to the inscription taken from Akenside), opposite an opening to the park. In a small recess we next come to an elegant urn of Bath stone, dedicated to the Right Hon. Lady Juliana Penn, whereon Mr. Penn, with a "filial respect and love," has attempted to record some of the virtues of his amiable mother. The walk leads now, through a thick shrubbery, to the termination of the dressed part of the grounds and a bust of Thomson, opening to the view a scene admirably contrasted by its wildness with the one we have just left, and carrying the eye over to Windsor Castle and Eton College. You may either pass on through a wicket-gate, and re-enter opposite the bust of Virgil, or return a little and approach the same spot by a walk within the boundary of the garden. From a seat here, surrounding the base of an oak, is seen, in rather a romantic situation, overhung by a "spreading beech," the ice-house, disguised by a wall of artificial rockwork, presenting a cave-like appearance; over one of the openings of which is inscribed the word "Tityri," associating it with the bust of Virgil, which is near this spot; the classic reader will readily enter into the spirit and meaning of this. There is a pleasing variety and effect of seclusion from the dell-like appearance of this part of the ground. The next object we come to is a fine youthful head of Milton, modelled by Chenie from an original portrait. After passing a glade commanding an angular view of the house, together with an extent of park, we are brought to another portion of flower-garden, situated, as it were, in the centre of a wood enriched with rare shrubs and flowers;

a gravel walk surrounds it, by the side of which, at about equal distances, are placed Newton, Locke, and Bacon; pursuing the walk from this last, you suddenly come upon Spenser and Chaucer; and, lastly, a handsome stone urn, dedicated by Mr. Penn to his cousin, the Honourable Richard Thomas Dawson, son of the late Viscount Cremorne.

Having now perambulated the flower-garden, there is little more to interest the attention. The walk to the church and shrubbery adjacent to the churchyard deserves, however, some little notice. The walk leads through a wilderness of thorns, and, crossing an artificial waterfall by a wooden bridge, shortly after enters the park; by crossing which, either upon the grass or by following the carriage road, at a distance of about 200 yards, we come to what is called the church shrubbery, which commands a private entrance to the church through a neat small cloister ornamented with painted glass. The shrubbery has several chairs, interspersed with inscriptions from the " Long Story," illustrated by vignette views painted upon the backs. One of these, upon an artificial mound, commands a very picturesque view of the church and churchyard, immediately over the graves of *Groom and Tyacke*, the two domestics made mention of by Gray in his " Long Story." It is but a short distance hence to the kitchen-garden, one of the remaining appendages to the old manor-house; but, though of considerable antiquity, it is very productive, and has a good pinery, vinery, &c., with small fish-ponds in it.

Stoke Park, Oct. 1833.

Art. VI. *Hints for the Improvement of the Town of Southampton, with a short Notice of the Vineyard at Shirley.* By the CONDUCTOR.

THE business which took us to Southampton was our being employed by the town council to make a plan for a General Cemetery; and being rather poorly, and finding the air of the town agree with us better than that of the Isle of Wight, which we had previously tried, we remained there a month.

Southampton is a town rapidly increasing in houses and population, but, unfortunately, it seems to have been badly managed; the town council consisting of two political factions, the object of one of which was to defeat the measures of the other. A better feeling now prevails, and both parties are uniting for the general good. The corruption of the citizens who are electors is well known to all who read the newspapers. A citizen observed to us on this subject, that " the devil is not so black as he is painted, nor are the citizens so corrupt as attempted to be shown before the election committees for party purposes, and as appeared by the newspapers at the time." As a proof of the influence of the radical faction, we may state that above a year ago the other party had fixed on a situation for a cemetery, high, dry, and with the soil of gravel to an unknown depth; but, under the pretence of its being half a mile too far from town, the bill in parliament for authorising it was defeated by a sort of trick, notwithstanding the horrors which, as is proved in the *Report on the Health of Towns*, were then daily taking place in the churchyard of St. Mary's. This burying-ground, which is the largest in Southampton, so long as it continues to be buried in, cannot fail both to contaminate the air of the locality and the wells of the vicinity. The consequence of the defeat of the bill alluded to is, that the council have been compelled either to do without a cemetery, or to fix upon a spot by no means so eligible for the purpose to which it is to be applied, as could be wished; it is, however, nearer town.

The alternate System of Burying. — In our design for this cemetery, we introduced a new principle, viz. that of providing in perpetuity for the superfluous earth dug out of the graves. Thus, suppose four coffins deposited in one grave, either at once or at different times, it is obvious that there must be a quantity of superfluous soil equal to the space occupied by the coffins; and somewhat more, from the soil taken out being broken into small pieces, and thus taking up more space than it did when it was in one mass. In country churchyards, where seldom more than one coffin is deposited in a grave, very little inconvenience arises from the earth that cannot be returned to the excavation, it being generally raised over the grave in the form of a mound; but in cemeteries got up on speculation, where, in order to make the most of the ground, a dozen coffins or more are sometimes deposited in the same grave, and where there are also many brick graves and vaults, the quantity of superfluous earth is enormous, as may be seen by the immense heap which has accumulated in the course of seven years in the Kensal Green Cemetery, and which the directors are now advertising to be given away; because, being consecrated soil, it cannot be sold. The principle which we have introduced into the cemetery at Southampton is, to divide the ground to be buried in into regular spaces; say into beds 16 ft. wide, with paths 4 ft. wide. Only every alternate bed is to be buried in at first, till that bed is completely full; and a calculation having been made of the quantity of superfluous earth that will be produced, the bed not to be buried in is to be excavated to such a depth (say from 18 in. to 3 ft., according to the number of coffins it is calculated will be placed in a grave) as will contain all the superfluous soil, without being raised more than a few inches above the general surface. The soil thrown out is to be laid on the surface of the bed that is to be buried in; and the intervening paths, the surrounding borders, and, in short, the whole surface of the cemetery, is to be adjusted in conformity with this arrangement. When the bed or compartment to be buried in is completely filled, then begin to bury in the adjoining bed or compartment in which the superfluous soil was put, and place the superfluous soil from this bed on the surface of that which has just been filled with coffins. It will raise this surface by the time the second bed or compartment is filled with coffins, from 18 in. to 2 ft., not in general more; because there is not only the surface of the grave to be covered, but the space between the graves, and also the common path between the two compartments. The head-stones, if any, will be somewhat earthed up; but they can always be raised at a moderate expense. Besides, in a well-planned and conducted cemetery, we think there ought to be no head-stones or monuments allowed, except in the borders which accompany the roads and walks, and in such other parts of the cemetery as may be exclusively devoted to that purpose.

It is obvious that this mode of alternately earthing-up and burying may be carried on for an indefinite number of years, even till the surface of the compartments is raised 20 or 30 feet above the natural surface, and consequently above the surrounding borders and walks. The burying part would in that case require to be ascended to by forming a portion of the 4 ft. path at each end of the beds into inclined planes of easy ascent. In the Southampton Cemetery, we have, in addition to 16 ft. beds of the kind described, designed large squares, exclusively for graves which are to have no monuments of any kind; and these, we have shown in our Report, may continue to be buried in till the ground is raised as high as an Egyptian pyramid, or until the custom of burying, and suffering bodies to be decomposed in the soil, gives way to the practice of burning them. We are persuaded that the latter mode of disposing of the great mass of the dead will be adopted in this country much sooner than even the most enlightened people at present imagine. The truth is, that very few persons indeed are aware of the diseases caused by crowded churchyards and vaults in churches; partly from the effluvia which they diffuse in the atmosphere, but principally from the contamination of the wells. Every large town will then have a funeral pile, constructed on scientific principles, instead of a cemetery; and the ashes may be preserved in urns, or applied to the roots of a favourite plant.

An intermediate improvement, and one required without delay for Southampton, is, authority to compel corpses to be buried several days sooner than they are at present; and what would be a valuable addition to this enactment, would be the establishment of one or two receiving-houses for the dead, such as those we have described p. 298., and to which every dead body, where the master of the house would not undertake to inter it in four days, should be carried in four and twenty hours after life was extinct. This is more imperiously demanded for Southampton than for any other town that we know, owing to the low situation of a great part of the town, and the great heat and moisture of the atmosphere. While we resided in the town, there were six successive days during which a thermometer placed in the shade, in the entrance passage to a shop, varied from 75° to 83°.

The situation of the old town of Southampton is low, flat, and very little raised above the water's edge; but in that part of the town which extends beyond the ancient walls the ground rises considerably, though gradually. The town is approached from London through a very handsome avenue of elms, on both sides of which is a common of 360 acres in extent, perhaps the finest thing of the kind in England. It is particularly unrivalled for its scattered oak woods, which are beautifully interspersed in some places with glades of turf, and in others with a broad expanse of heathy surface, intermixed with an endless variety of groups of hollies and thorns, many of the latter producing scarlet blossoms. Though this common extends two miles from the town gates, yet we have no doubt the time is not very far distant when it will be as much surrounded by houses, and, as it were, enclosed in the town, as Hyde Park and the Regent's Park are enclosed in London. It would appear from the newspapers that some attempts have been lately made to let a part of this beautiful common for building on: but we do hope that all such attempts will be defeated; as, should an encroachment of this kind be once made, no one can tell where it would stop. Beyond Southampton Common is Shirley Common, an immense mass of gravel, high, dry, and airy, and, we should think, one of the healthiest situations in England, as well as a very beautiful one from the woods in the distant horizon all round it. We remained a month in Southampton, but we know very little of the neighbourhood, or even of the town, being the whole time so much an invalid as to be able to walk only in the High Street, along the shore, and in Bernard Street, in which we lodged. We mention this to show on what a very slight knowledge of the place the following remarks are founded. We have made them, however, feeling confident that they may be of some use as suggestions to those who m y have occasion to study the improvement of this town, or any other similarly situated.

Covering the Bay with Water when the Tide is at the lowest. — Southampton has at present a bad reputation from the number of acres of mud slightly covered with marine grass, which are exposed to the action of the sun and air every time the tide is out. One of the first things that ought to be done, in our opinion, is to remove this mud to such a depth as would allow of the whole bay being constantly covered with two or three feet of water, even at the very lowest tides. This might be effected in two or three ways at no great expense. First, by filling small boats with the mud at low water, and during high water pulling these boats ashore and emptying them by cranes, so as to form the mud into a platform, quay, or whatever might be desirable; or, secondly, by greatly extending the sea wall into the bay, and filling up the space between it and the present shore with mud from the bay. Both modes might be adopted according to circumstances. It is quite unnecessary to enter into details.

Sewerage. — The situation of the sea wall being fixed on, not only throughout the whole of the present length of the town, but to whatever extent it may be supposed to reach up and down the river in the course of fifty years, say somewhere beyond Blechendon Terrace, or perhaps even as far as Milbrook Point or Milbrook itself at the one extremity, and nearly as far as Netley Fort on the other, the distance at which lines of houses are to be kept from the river should also be fixed on. Then construct a sewer also the whole of this length, between the houses and the water, taking care to provide for the free egress of streams of water to the river, by conducting them in inverted siphons under the sewer in some cases, and in others, where the clear water is of some extent, as in that of the river Itchen, carrying the sewer (in a cast-iron pipe, perhaps 2 ft. or 3 ft. in diameter, and joined so as to support itself) over the stream. This arch may be of a sufficient height to allow masted ships to pass underneath. The sewer also should have occasional safety sluices, to admit of turning its contents at once into the bay in case of extraordinary rains, or other cases that might endanger the bursting of the sewer. This main sewer we would carry down for a mile or two parallel to the margin of the bay, raising the bottom of the sewer gradually to the surface, so as at the extreme end to deliver its contents there in such a situation, and in such a manner, as would render them available for irrigation or other agricultural purposes.

The object of this main sewer is to intercept all the other sewers, so as to prevent now, and at all future times (with the exception of cases when the safety sluices are opened), any of the sewers from emptying themselves into the bay. When the town extends in all directions, a second, and perhaps a third, intercepting sewer may be required in the interior of the town; the direction of these may be, if the surface will admit, somewhat parallel to the main sewer; and they may be so conducted as to deliver the sewerage on the surface at higher levels than that of the lower or main sewer, so that the contents shall be applicable to higher grounds.

The principal objection that we can foresee will be made to our plan of having the main sewer close to, and parallel with, the edge of Southampton Water, would be the difficulty of conducting such a sewer across the river Itchen; but over this river, or one as wide as the Thames, a sewer might be conducted, as we have already stated, by a siphon supported at any height that may be required. Let it always be recollected that when a siphon is introduced into a sewer, no very weighty materials will be carried over by it, so that the tank or well in which the longer leg of the siphon is inserted will receive the grosser parts of the sewerage, which may be carted away as often as is found necessary.

If some plan of sewerage, such as we have above suggested, were adopted at Southampton, the water of the estuary would be kept perfectly clean and wholesome; but if some such plan be not adopted, even if the mud were taken out, the deposit of the sewers would soon occupy its place and rise above the water, and render the shore, in time, much more unwholesome than it is at present; and this unwholesomeness must necessarily increase as the town increases in size.

How the sewerage of Southampton is managed at present we know not; but that it is in a very bad state we had the evidence of our senses in walking along the streets that we have mentioned, and it is doubtless a great deal worse in the obscure streets and by-places, into none of which did we enter. Wherever a town is to be formed on the banks of a river, a lake, or an inlet or bay of the sea, this mode of having an intercepting sewer parallel with, and close to, the clear water, will be found an exemplification of the true principles of sewer arrangement. In a populous country like England, the large rivers, such as the Thames, ought to have side sewers, which may be open ditches in parts of the country not built on, from the source to the mouth; and the tributary rivers ought also to have their sewers. The clear streams can always be admitted under the sewer, or the sewer may be carried over the river by an upright siphon; the sewerage can always be delivered on the surface for agricultural purposes by divergent ditches; which, instead of following the slope of the sewer, shall proceed from it in a very gently sloping direction, till the bottom of the ditch is at last on the surface, and the water running over and manuring the fields.

Direction of Streets. — In a town that has the character of being damp, it is of great importance to lay out the streets in such a manner, more especially in the lower parts, as that the sun may shine on the whole surface of the street, and also on the fronts of the houses on both sides, every day in the year in which it appears. For this reason, as many of these streets as possible should be in the direction of south and north, and as few as possible in the direction of east and west. All the diagonal directions are admissible, and to be preferred in proportion as they deviate from the east and west line towards the south line. A street in the direction of east and west has the houses on the north side too hot during summer, and the houses on the south side do not enjoy the direct rays of the sun for a number of weeks during winter. The same observations will apply to a house which stands east and west; but, as we have already said so much on this subject in our *Cottage Architecture*, as well as in this Magazine, we drop it abruptly.

Architecture of Street Buildings. — We have seldom seen a town where so many buildings have been recently erected, and so very little taste exhibited in them. With the exception of the buildings at the railway station, and the villa of Mr. Hoare at Shirley, we really cannot refer to one as a specimen of good taste. It is true our walks have been very limited, and we have not seen the Infirmary, but we have ridden through the continuation of the High Street. There are two Banks and two warehouses that are negatively good, because they do not offend by misplaced ornament, that is, ornament placed out of the regular order in which it ought to be introduced. To show what we mean by bad architecture and bad taste, we shall take a street of six-roomed houses, viz. Bernard Street, lately built by an individual who could be under no control as to his elevations but that of his own wishes. The street is of a very sufficient width, being of one third more than the height of the houses. The line of frontage is ornamented with pilasters supporting a small entablature; and in each of these pilasters there is a sunk panel which is surrounded with mouldings like those of a room door, or inside window-shutter. To sink panels in pilasters, and ornament these panels with mouldings, is to destroy altogether the simplicity and dignity of the pilaster, and to reduce it to the rank of a mere piece of joiner's work. Before any pilasters were added to such an elevation, there ought to have been facings to the doors and windows. There is a certain gradation of architectural ornament in which alone it can be introduced with propriety. In every building, the first additions to what is merely necessary are architraves, that is, facings or finishings of some sort to the doors and windows; the second is the cornice or other termination to the walls which support the roof; and the third consists of the chimney tops. After this, the expression of construction may be given to the walls by pilasters, piers, buttresses, or whatever is required for the architectural fiction that is to be adopted; for pilasters being originally square pillars of stone or wood of the full thickness of the wall, the spaces between them being filled in with materials that took no part in supporting the roof, the raising of the appearance of pilasters on the face of a stone or brick wall, in plaster or stone, is a mere fiction adopted to carry out the style. There is not, however, one architect in a score that knows his art scientifically, or can give a scientific reason for what he does.

We would strongly recommend that the town of Southampton should imitate the city of Philadelphia, and have a committee of taste, composed of architects, engineers, and amateurs, with power to call in the assistance of professional men from London or elsewhere, to which all designs for buildings whatever should be submitted before any attempt was made to carry them into execution. We would by no means have all the designs corrected by one architect, as is the case in some cities on the Continent, however great the genius and abilities of that architect might be, lest we should introduce a sameness of manner; but, when a design was disapproved of, we would desire the parties to bring fresh ones, pointing out the faults of those that we rejected, by which means we should hope to unite a certain degree of originality with sound sense and good taste.

It seems that in Southampton there is a great objection to employing any other talent than that of persons located in the town, which is a most contracted idea, calculated to perpetuate things as they are, and impede every great improvement; in short, calculated to have the same effect as the doctrine of precedents, which is now held up as an infallible guide in Gothic architecture by the Camden Society, which may truly be called a society for impeding the progress of architecture in the Gothic style. Precedents, whether in architecture, agriculture, or any other art, we hold to be the greatest bane to all improvement.

Public Walks. — These should be provided for in different parts of the town, and especially all along the shore from one end of the quay to the other. It is a delightful thing to see trees growing vigorously along the sea-shore; but in addition to the elms and limes, which are the only kinds growing there at present, we would add common, Neapolitan, Norway, and other maples, hoary poplars, Turkey oaks, and a number of others which stand the sea breeze. Some broad streets might be planted with rows of trees on each side; and something of the nature of a boulevard or of a zone, such as we have recommended for the extension of London (Vol. for 1829, p. 687. fig. 171.), with trees and broad expanses of turf, might be carried from the quays up to some open places in the New Town, so as to form very handsome drives and walks, and to insure breathing-places of several acres of turf, and ventilation for all the inhabitants. The walks which now exist are very deficient in good seats: and there ought also to be covered seats along the quays for protection from the sun during summer, or the rain during winter.

If a suitable situation could be found, an arboretum, or a complete collection of trees and shrubs, would be a very desirable addition. We hope, however, that no attempt will be made to plant an arboretum on less ground than forty or fifty acres. That extent of ground might be purchased on a building speculation, the interior planted as an arboretum, and the circumference built on, either with detached villas, or with continuous rows of houses, as in the Regent's Park.

An additional supply of water to the town is now sought for by sinking an artesian well, the depth of which at present is 1170 ft., and the cost hitherto is 12,000*l.* The chalk is believed to be nearly gone through, so that it is hoped water will speedily be obtained, and we trust this will be the case. If this resource should fail, however, there are others which can be rendered available, so that there is no doubt of the town being in time abundantly supplied with excellent water.

The Vegetable and Fruit Market at Southampton is a century behind Covent Garden. We could not have believed it possible that such wretched cabbages, turnips, and even potatoes, could have been exposed for sale; and the fruit, more especially the apples and pears, is still worse than the vegetables. A spirited market-gardener from London, who might settle in the neighbourhood of Southampton, would be sure to do well, as fine fruit and vegetables generally only need to be seen to command a sale. As to flowers, we do not recollect ever seeing so large a town with so few, on the window-sills, in the shops, or in the little front gardens, of which, however, there are scarcely any. How different from Brighton! though the latter place is much more exposed to the sea breeze, and in a colder climate.

Evening Shelters for Working Men. — Some years ago, in autumn, we stopped all night in the little town of Romsey, and we were struck with the number of workmen standing in groups in the market-place, and before the doors of public-houses, even after it was dark. It immediately occurred to us, that a plan which has been adopted by some of the tradesmen of London for their unmarried journeymen and apprentices, would be a very great source of comfort to the Romsey labourers, whom we presumed to be also single men, with no other home than perhaps a garret bed, and consequently without any place in which they could spend the evening, except the public-house. What we then proposed for Romsey, we now propose for Southampton, viz. that there should be rooms opened here and there throughout the town, furnished with a table, forms, and seats; and, when the nights were dark and cold, with a fire and candles. On the table there should be a number of cheap publications, such as *Chambers's Journal*, the *Penny Magazine*, &c. One man should have the care of the room, and should be entitled to charge a halfpenny for every one who entered it. It should also be a part of his duty, if the company in the room requested it, to read aloud to them, or in some way or other to amuse them, no smoking or drinking being allowed. It is obvious that this would add greatly to the comfort of that part of the labouring population who had no regular home, even if they did nothing but sit and sleep there; and the expense to the town would not be great. The moral character of the population would, in time, be very considerably improved. The rooms might be taken in some of the back streets, where houses are cheap. We have no doubt there are many young men in Southampton that would volunteer to deliver lectures, or to recite amusing or instructive passages from books, or otherwise to entertain the occupants of such rooms for an hour or two in the long winter evenings. The rooms ought to be closed at 9 o'clock at the very latest, for every labouring man ought to be in his bed at that hour.

Naming the Streets and numbering the Houses.—Great improvements have been made within the last few years in the raised letters used in naming streets, particularly in Paris and Edinburgh. The best mode, we believe, is that described by the late Sir John Robison, under the signature "Civis." (See p. 88.) The numbers of the houses ought, as in Paris and many of the new streets in London, to have the odd numbers on one side, and the even ones on the other: and the numbers ought always to commence at the same extremity of the street, at the end nearest say the south for streets in the direction of north and south, and at the east end of streets running east and west. By examining the map of Paris, many excellent hints will be obtained for street arrangements.

Regulating the Charges made by Cabs, Flies, &c.—The impositions of the cabmen, coachmen, and flymen, plying at the termini of the railroads, is notorious to every railroad traveller; and, indeed, the drivers of hackney vehicles, wherever they may be stationed, or by whom employed, seldom fail attempting to overreach their employers. The remedy for this, in the interior of towns, appears to us to consist in appointing a great number of places, where every quarrel with regard to charge may be adjusted; and, in regard to railroads, we think an officer ought to be appointed by the directors to determine all fares of cabs, flies, or coaches, and that the determination of this officer should be considered to be final by all those who ply for fares at the termini. This officer should be stationed as a sort of outpost, in such a situation as that all the carriages going in and out should pass before him; and the driver of each hackney vehicle as it passed in, of which the fare was not agreed on between the driver and the hirer, should apply to the officer, showing the luggage, &c., and stating whence he came, or whither he was going, so that the charge might be settled at once. Some arrangement of this kind appears to us absolutely necessary; and we think the directors of railroads, who have already done so much for the comfort of the public, ought not to grudge the additional charge which such an officer as the one we contemplate would involve.

Perhaps, in the interior of towns, a number of the more respectable shopkeepers might be found willing to undertake the office of settling cab and hackney fares; and of course no cab, or other public vehicle plying for hire, ought to be licensed, whose proprietor would not assent to this arrangement.

The names of the shopkeepers who would undertake to settle fares, the fares themselves, and all other regulations concerning them, ought to be printed in a distinct type, and fixed up in a conspicuous place in every public vehicle, as in Paris. As a proof that this would be useful in Southampton, we may state that, when we were there, we were charged 2*s.* 6*d.* from the terminus to the pier on one occasion, though the fixed fare, as we learned afterwards, is only 1*s.*; and on another occasion we also paid 2*s.* 6*d.* where the fixed fare was 1*s.* The circumstance of the fares being fixed was of no use to us, because we had no opportunity of knowing them till after we had yielded to the imposition; whereas, had the fares been printed and fixed up in the vehicle, as in Paris, we or any other stranger would have been immediately aware of the right sum we ought to have paid.

The shops, owing to the warm moist air of Southampton, are infested with flies to an almost incredible degree; but, as most of these shops are without cross lights, the flies might be easily prevented from entering them by the very simple, economical, and efficient mode adopted in the butchers' shops in Italy, and first brought into notice in this country by William Spence, Esq., being published in the *Trans. Ent. Soc.,* and also in our Vol. for 1836, p. 264., and *Mag. Nat. Hist.,* 1834, p. 271. This mode consists in the application, against the open door or open window, of a very wide-meshed black net; and we observed, in the summer of 1842, that the plan has been adopted by the butchers of Torquay, with perfect success. In Southampton it is much wanted, not only in the butchers' shops, but in grocers', confectioners', and fruit shops. The inhabitants, however, have not a sufficient repugnance to flies, beetles (which are singularly abundant, at least in Bernard Street), and other vermin, with the exception of the rat and the mouse, to care much about them.

The Vineyard, C. Hoare, Esq., at Shirley, about two miles from Southampton, is a very interesting place, from the experiments on vines now carrying on there by the proprietor. The house is a gem of beauty, by Mr. Elliott of Chichester. The principle of the concentration of the sap is carried by Mr. Hoare to an extreme degree; and it will not be surprising to us if he effects a great revolution in grape-growing, both in the open air and under glass. The grounds of this villa occupy two banks almost entirely of gravel, and which, before the land was purchased by Mr. Hoare, grew little else but heath, dwarf furze, and brambles. The bank on which the house is placed, and the vineyard established, is a curve, the tangent to which would probably form an angle of from 35° to 45° with the horizon, and faces the south-east. The greater part of this bank is to be devoted to the culture of the vine, against low brick walls about the height of those at Thomery, in glazed pits, and larger glazed structures, and perhaps trained round hollow brick columns, provided some experiments now in progress succeed as well as they promise to do. On the upper part of this bank stands the house; and in the bottom, between the two banks, is a running stream. On the opposite bank Mr. Hoare has planted a pine wood, which has already an excellent effect, besides its utility in shutting out the rising village.

As something more may probably be expected from us respecting the mode of cultivating the vine at Shirley, we may observe that Mr. Hoare does not profess to have any thing *new* on that point. It is based, he says, on the principles laid down in his *Treatise*, without the slightest deviation whatever. Indeed, the result of every year's experience strengthens and confirms those principles, and proves to Mr. Hoare, beyond the possibility of doubt, that they cannot be transgressed with impunity. He further observes that some of the principles he has laid down may even be carried to a greater extent than he has stated, and with very considerable advantage. Two of these, he says, are, that which enforces the necessity of having a perfectly dry soil for vines to root in, and that of limiting the quantity of fruit that a vine ought to be permitted to bring to maturation. Mr. Hoare hopes shortly to establish the fact that vines will perfect their fruit, with far greater ease and certainty, when planted in a mass of dry materials to the exclusion of soil, than they have hitherto done when planted in the usual way. And he flatters himself that this will ultimately be one of the greatest improvements ever yet introduced into the horticultural practice of this country. With reference to the sorts Mr. Hoare cultivates, the two principal are the White Muscadine and the Black Hamburgh, which he considers are the very best that can be grown for general purposes.

On asking Mr. Hoare's opinion of Mr. Roberts's practice of thinning the buds while the leaves are yet on, his answer was, that he thought it a good one; and, in fact, another step taken in the right direction, viz., in concentrating the sap, which must be constantly attended to in this country on account of the deficiency of solar heat. The direct advantages of the practice arise from its placing at the disposal of the remaining buds a much greater quantity of organised matter than they would otherwise possess, which enables them to nourish and mature the fruit they produce to a proportionately greater extent. It is, in fact, neither more nor less than undercropping, which Mr. Hoare is so constantly and so strenuously insisting upon in his book, and in his interviews with gardeners and amateurs, by great numbers of whom he is visited. Mr. Roberts's practice, Mr. Hoare observes, would be of no benefit on the open wall. There are many statements and recommendations in Mr. Roberts's book, in reference to the glass culture of the vine, which Mr. Hoare does not approve of; and, in short, he considers the disbudding with the leaves on as the only part that claims either to be new or of much value.

ART. VII. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 546.)

LETTER XXII. *The principal Causes of Canker in Peaches, Nectarines, and Apricots.*

HAVING promised you, when here, a few of my own practical observations on what I consider *the principal cause of canker in peaches, nectarines, and apricots*, I now send them to you. Every person that is in any way whatever acquainted with those fruits knows they are not natives of this country, and that they require the protection and assistance of a wall, &c.; but we never shall have good and certain fruit-bearing trees, of the above kinds, in this country, for many years together, until we give them some farther protection than a bare wall. I have been perfectly satisfied, for some years, that the winters we get are the principal cause of the canker in our fruit trees; and presently, in my humble way, I will attempt to point out several instances that I have observed in the course of my practice.

In the years 1815 and 1816, I recollect assisting to make a new kitchen-garden in a field, where the surface soil, for about 2 ft. in depth, was a beautiful sandy loam; the subsoil a sand: in some places there were spots of marl to be seen in trenching it, which was well done; in others a shell rock, that is, thin layers of flat stone; and altogether as fine a bottom, for the well-doing of fruit trees and kitchen-gardening generally, as one could wish. Where it was considered more soil was required, it was carted from an adjoining field, taking the surface spit of an old pasture, and an old hedge-bank. A 12 ft. wall was built all round it, and a slip or belt fenced in with pale fencing from 30 ft to 36 ft. from the wall, all round; so that both sides of the wall were brought into use. The wall was furnished with some of the best-trained fruit trees that could be got at that time; some from Lee and Kennedy's, others from France. They were planted with great care, keeping the roots well to the surface; and they grew away to such a degree, that, to throw them into a bearing state, in the spring of 1818 we root-pruned many of them, which was the means of their making as beautiful, thick, short-jointed, and full-eyed wood, as one could wish to see. Indeed, in the ensuing summer, which was a very long, hot, and dry summer, there was a beautiful crop of fine fruit on many of the trees; and, in 1819 and 1820, I think I never in my whole practice saw handsomer, better-trained, and more fruitful trees, or trees that brought fruit to better perfection. Root-pruning occasionally any tree that is too luxuriant is the means of immediately bringing it into a bearing state. The trees entirely covered the wall in most places by 1820, and it was truly a pleasure to be with them pruning, nailing, &c. On the 21st of December of that year it set in a very cold strong-blowing north-east wind, and froze very severely: it continued blowing and freezing for many days. On the 20th of January, 1821, the wind shifted full south, and on the morning of the 21st every thing was loaded with ice and rime; and the thermometer exactly at zero at five in the morning. On taking hold of iron it stuck to my hands; and the foggy rime so twinged my nose, that I was obliged to put my hand to it. Having some distance to go that morning, I could hardly keep my nose warm for some time. The sun rose clear and bright, and melted off the rime; and almost every plant that was green, on which the sun shone, was roasted up, and died. I recollect what a strong smell it caused in the market-gardens about London. There was scarcely a green vegetable left. The evergreens suffered greatly, and the above-described fruit trees were so punished that they were completely crippled. I recollect they never flourished after; many of them were cankered all over, where the sun was the most powerful. When the pruning and nailing season came the young wood was full of spots, and when the sap rose all these spots became gummy. Likewise in many places about the old branches, particularly about the stem of the tree above where it was worked, were other spots, where the bark died, and went dry, like as if it had been burnt. The consequence was, when the trees should have come into bloom, much of the bud had fallen off; and much of it that did have strength to expand was so feeble and weak that but a very scanty crop of fruit was the result the following summer, and that but poor and small; then, when the leaf should have expanded, it took to curling up and blistering.

With all the washing and picking over, it was continually smothered with the aphis of different kinds. After midsummer many of the old branches died piecemeal; and the young wood that the trees did make was poor, and much subject to the red spider in the latter end of summer. In the course of about three years after, every peach, nectarine, and apricot, except part of one old Royal George peach, was dead and gone. All the fault was laid to the subsoil; not the least idea, or the least remark, was expressed about the severe frost, only that it had killed all the furze on the commons, almost every evergreen, and all the vegetables: not so much as one cabbage or broccoli was left in the whole garden. Time passed on, and I happened to be in practice in different places. I was in the habit, for years, of going to see every place of any note every opportunity I had; and, in damp foggy situations, I have often seen the wall trees very much punished by the frost in the above-described manner. When the winter of 1838 came it gave me an opportunity of observing the effects more fully than heretofore; for I believe it killed thousands of wall trees, and punished them so severely that they have died a branch at a time since.

On entering Bicton Gardens in 1840, where the frost had not been so severe, I thought I never had beheld a finer lot of peach, nectarine, and apricot trees, covering a large space of wall. In January, 1841, we had three days of continued driving thick fog, like mizzling rain, the thermometer standing in the day at 30° and at night at 28°; so that every thing that caught this driving south-east fog was glazed all over with ice. The fog cleared off the third night; the stars twinkled, and there was 17° of frost at six o'clock the following morning: the sun rose bright and clear, and continued shining until noon.

When pruning these poor trees in the spring, I had the mortification of again seeing what I have before stated, viz., the young wood full of spots. When the season advanced most of the buds dropped off; the others opened very weak, the principal falling off without setting any fruit; and several of the finest and most luxuriant trees actually died before the following October. Some have died since; others have lost large branches; and others again are full of those spots on the old wood, where it was exposed to the frost and sun, looking like burnt places, the bark having been drawn away from the wood, and never adhering to it again. The plum stocks that many of them were worked on did not suffer in the least, but filled the ground with suckers all round, as far as the large roots extended; and on taking them up I carefully examined them, and found the roots sound and good; full of strength and vigour. The preparation made for them, and the subsoil too, are very similar to what I have before described; lying very healthy and dry, nothing, I think, can well be better.

The same season I noticed many of the standard plums, apples, and pears, expand their blossom very weakly, and it fell off. The leaf and young shoots were curled up and smothered with honey-dew, and varieties of aphis; the trees on the west walls suffering least. I always found the trees that were most injured were those which were covered with white rime or hoar-frost after much wet, or in moist situations. A dry hard frost does not seem to have any injurious effect on them; but dampness with a severe frost, of course, is the cause of rime or hoar-frost, which causes those spots and blisters on both old and young wood, by raising the bark from the wood, or more properly speaking, causing the moisture the wood contains to expand, and leaving, when the frost is gone, a cavity between the bark and wood of those parts so affected. Of course, the tree that is the most luxuriant and unripe is the greatest sufferer: the young wood looking spotted and gummy; the old wood having dead spots of great length in some instances, and after a time cracking and oozing out gum; and those branches which have the bark loosened all round are soon observed to die away. Some others, that are only partly affected, will flourish for several seasons, and bring tolerable fruit. In some instances I have seen the bark that was so affected cut away, and new bark enticed to grow over the wound. I have frequently observed the stem or stock of the tree, in a most healthy state, oozing out gum in great abundance at, or a little above, the place where it had been worked.

What makes it appear to me the more probable that my own observations are not far from being right is, that you never see a peach or a nectarine tree get the canker in a house that has the borders properly made, that is to say, well drained; soil not being so much an object as good drainage and a healthy dry bottom; trees can always be well fed and assisted when they require it. But, if you uncover the house by taking the lights off before the wood is properly ripened, and allow the wood to get frozen, it will not be long before you will see the effects of canker making its appearance; or, if by chance you leave the top-lights down, to expose the trees of a late house, in a severe frost, you will be certain to see the ill effects of it the next spring and summer. On the other hand, if a tree is bruised in any way, or pruned at an unseasonable time, you will certainly soon see your old complaint, the canker, make its appearance. There is more judgment required in thoroughly ripening the wood, than in ripening the fruit.

How can it be expected that any fruit-bearing tree, with its wood in a soft unripe state, can produce fruit in perfection? Is it not a most unreasonable thing for any one to expect? How can any man expect to ripen the wood of either peach or vine, by hurrying the lights off the top of the house? Is it not most unreasonable to expect such a thing? Why take the lights off at all? Is not man wise enough to give the trees what assistance they require without?

I find, by taking pains and persevering to ripen the wood, I am saved a wonderful deal of vexation and disappointment afterwards, both with disease and vermin; and I am perfectly satisfied, were this more attended to, and the trees protected in severe weather, we should not hear much of canker, of the trees blooming so weakly, of the fruit not setting well, or of its falling off after having set. And, again, at the stoning season we should not hear of their falling off in such abundance. Besides, how can a tree make perfect wood for the next year, if the previous year's wood was not ripened and perfect? I say the remedy lies with ourselves.

I have seen many gardeners take the lights off both peach-houses and vineries, and I have heard them say it was to ripen the wood. I say, ripen the wood first, and then, if you think proper to expose them for a time, do so; but do not let them stay to be punished and crippled with severe frost, and then, say it is the fault of the border, or the subsoil, or want of sufficient drainage; for I think people will get wise enough, after a time, to know better. I hope to see the time when we shall not see so much badly coloured fruit, so much canker and shriveling.

I am perfectly aware that there has been a great contention amongst gardeners respecting the cankering of fruit trees; therefore I hope my humble, but practical, opinion will not be the means of causing any misunderstanding.

It is my intention, for the future, always to protect wall trees, under my charge, against severe frost.

I will endeavour, when treating on the forcing of peaches, to give a recipe for washing them.

Bicton Gardens, Jan. 9. 1843.

LETTER XXIII. *Notes on the One-Shift System of Potting, and on Charcoal.*

MANY of our most extensive practical men of this country have visited Bicton this season; and, with much pleasure, I find through them that my method of plant-potting is most extensively and satisfactorily practised. I have read, too, with some interest, this summer, a said to be new method of potting plants: I imagine it is founded on the rough soil and stone system of potting. It was no sooner made known than plants were exhibited, and said to be grown on this so-called *one-shift system;* although, to any experienced man, the plants were well known to have been growing for years previously on the old system. For my own part, I think but little merit is due to this system at present; for I hear, on good authority, from different quarters, that many valuable plants have been lost through going to the extreme with the one-shift. Notwithstanding it is said to be a more natural treatment for plants, I am at present of a different opinion, more particularly with hard-wooded plants; although many practical men are aware I have been in the practice, for years, of giving plants very extensive shifts: how else could it be possible to have plants growing in a small 60-sized pot, and the same plants in a few months large specimens in a No. 1- or 2-sized pot, amongst lumps of soil and stones larger than a 60-sized pot itself? For my own part I shall always shift a plant, if possible, when it requires it.

Mr. Ayres, in his Weekly Calendar to the Amateur, in the *Gardener's Chronicle*, in the beginning of this summer, makes an observation on the use of *charcoal*. He says, "I attribute my whole success in plant-growing to the use of it;" observing that the charcoal I make use of is all made from vegetable refuse. Possibly, if Mr. Ayres should happen to read my method of plant-growing for the next year, he will discover there is something else besides charcoal used by me; and that I find charcoal made from an old gate post, for different purposes, answers as well as other vegetable refuse. Although it has not exactly the merits of Old Parr's or Morison's pills, I hope never to be without it for plant, fruit, or vegetable growing.

Bicton Gardens, Sept. 20. 1843.

Art. VIII. *Notice of a Visit to Bicton Gardens, in October,* 1843. By Thomas Bray, Gardener to E. B. Lousada, Esq.

I have been in the habit of visiting the noble gardens at Bicton for the last six years. A few days since I visited Mr. Barnes, the gardener, and I found him just in the act of cutting two Queen pine-apples. As they were such handsome fruit, I beg to forward you the dimensions, weight, &c., of them.

	Weight.	Length.	Circumf.	Length of Crown.	Length of Stalk.
1st.	6 lb. 2 oz.	11 in.	18 in.	2 in.	3 in.
2d.	5 lb. 7 oz.	10½ in.	17 in.	2 in.	3 in.

A third not cut, but equally handsome, and regularly swollen. These are not singular, nor any novelty there; for at all seasons of the year fine pines are to be seen at Bicton. Mr. Barnes thinks he will improve, even on these; for he picks out some fault himself in every thing he produces; and, judging from the extraordinarily robust, healthy, and vigorous succession pine plants he has, I think he is going a fair way to improve.

I can only say, all the other houses, and every department, are in equally good keeping, and fully bear out all that has been said of them this last year in your valuable Magazine. I have observed in the present month's Magazine it is likely we shall soon see Mr. Barnes's method of pine-growing. It appears to me so different from all others, that it is likely to cause a greater sensation amongst pine-growers generally than any thing before produced; and I am sure it will be viewed with much interest. In every house you go through at Bicton there are some novelties to be seen: the orange, camellia, New Holland, and heath-houses, have all rare specimens, in the most vigorous condition. The extraordinary specimen of *Èrica* Massòni, I must say, is at this time truly grand, with upwards of 300 heads of its beautiful wax-like flowers expanded. It is worth going any distance to see.

In the large palm-house, with its noble and interesting plants, I observed at this time in fruit four varieties of Mùsa; viz., M. Cavendìsh*ii*, M. Dácca, M. sapiéntum, and M. paradisìaca. A noble plant of Doryánthes excélsa has lately been in flower, and there are many other equally fine plants.

The orchideous, stove, greenhouse, and conservatory plants are all equally healthy; and in each house there are many beautiful and rare specimens.

The vinery I must not forget, which, in my humble opinion, far surpasses every thing grown in the way of grapes, with its fine handsome bunches and large berries well coloured. In a word, from the mushroom to the pineapple, it far exceeds all that I have ever seen.

Peak House Gardens, Sidmouth, Devon, October 7. 1843.

Art. IX. *Design for Five Suburban Dwellings, forming a continuous Range, with their Gardens.* By R. Varden, Esq., Architect and Landscape-Gardener.

[We request the attention of the architects and builders of Southampton to this article.]

This range of buildings, of which *fig.* 120. is a general plan, with the dwelling-houses fronting the main road, and the stable offices placed along the back road, with the gardens between, may be increased to any number of houses, by repeating the end houses, without materially affecting the composition. It is of little consequence whether the fronts be of light-coloured brick with cement or stone dressings; wholly covered with cement; or cased with wrought freestone; except that the last mode makes the weaker wall. The centre house is considerably the largest. It is entered from a portico of six Doric columns (*fig.* 122. *a*), the access to which is through the three centre intercolumniations, and is approached by three steps. Each of the end intercolumniations has the podium extended the full width of the area that gives light to the basement story, in order to receive the ends of the steps, and to support a metal railing to fence the portico from the area. In the flanks of the portico, the railing is straight, but in front semi-elliptical; and it is not to be let into the columns, but to be supported by strong standards placed tolerably close to them, so as to obviate the ill effect of attaching any thing, however small, to the shafts of the columns. The portico is surmounted at the ends with two enriched masses, that will be seen to great advantage against the plain wall of the house; they are connected by gradients or little steps.

The windows of the principal chambers are connected by architectural dressings, for the purpose of overcoming what would otherwise be an objectionable arrangement, viz., that of having the piers between the windows narrower than the openings; and it likewise has the effect of forming a central object more enriched than the rest of the design, the result of which is generally good.

This centre house has a pediment over it, to mark it as the principal feature in the composition; and the pediment is crowned with an ornamented acroterion. The windows of the principal floor, on each side of the portico, are in deep recesses between antæ that correspond with those of the smaller porticoes, which connect what may be considered as the wings. The windows above these are small, with semicircular heads, over which the wall is solid; a plain surface here being requisite to give breadth and repose to the composition. The two side attics must, therefore, be lighted by flat windows in the roof.

The entrance from the portico is into a passage having a groined roof supported on antæ. A door on the right hand conducts to a small morning room or study (*b*), 14 ft. by 10 ft. 6 in., fitted up in an unpretending manner. At the end of the passage is another passage somewhat wider, crossing it at right angles, likewise having a groined roof supported on antæ. At the point where the two passages intersect each other, the groining is circular, and this is an appropriate place for suspending a lamp. At the end of the passage, opposite to the entrance from the portico, is the door into the drawingroom (*c*), an apartment 27 ft. long and 14 ft. broad, lighted by three windows, and having at each end a fireplace between two arches, so as to allow of the cornice being carried all round the ceiling without breaks. The transverse

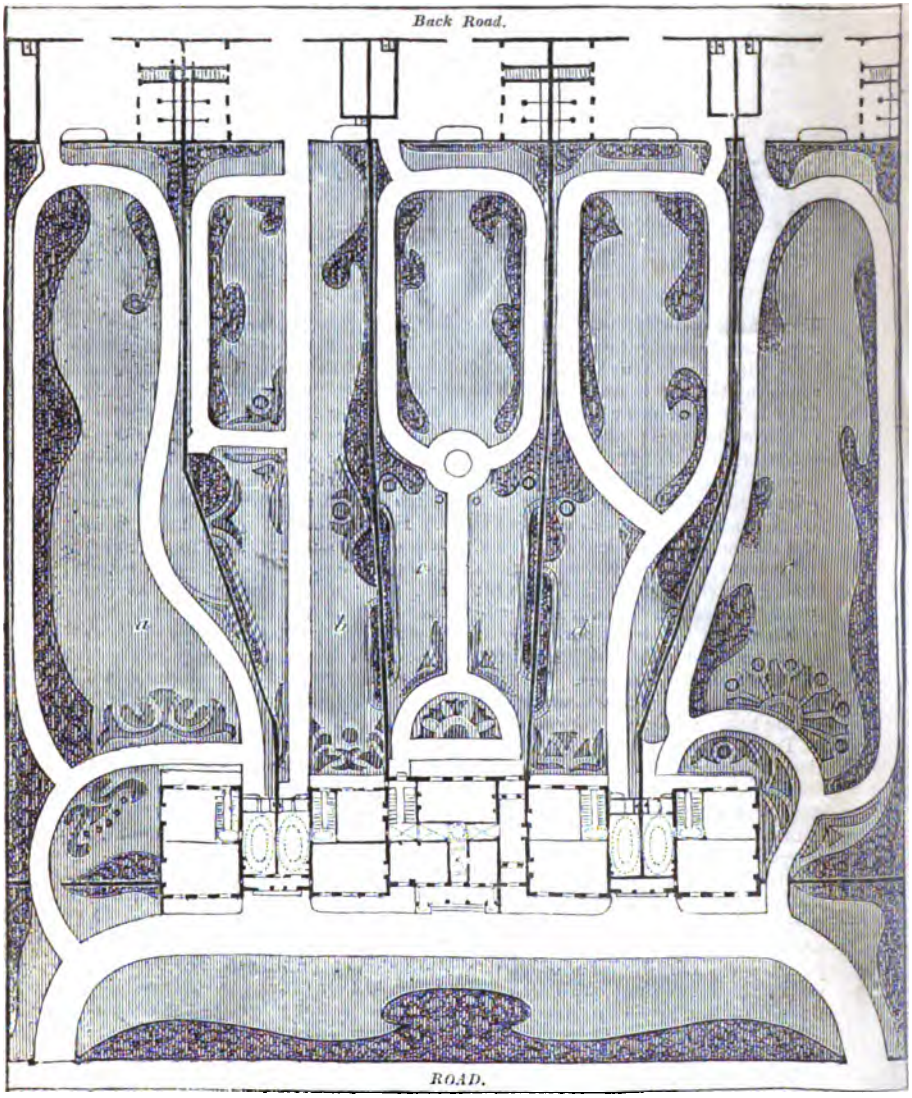


Fig. 120. *General Ground Plan of Five Suburban Dwellings with their Gardens.*

passage has, on the right hand at the end, a door to give access to the library (*d*). This is a room that partakes of the gallery form ; it being 34 ft. long and 10 ft. broad; but this length will not be unsightly, as a portion is parted off from each end by columns and antæ. On the contrary, this form will be particularly convenient, from its presenting a very large surface of walling for the bookcases. The fireplace is in the centre of one side, and is opposite to the door. By this arrangement, an air of extent and magnificence

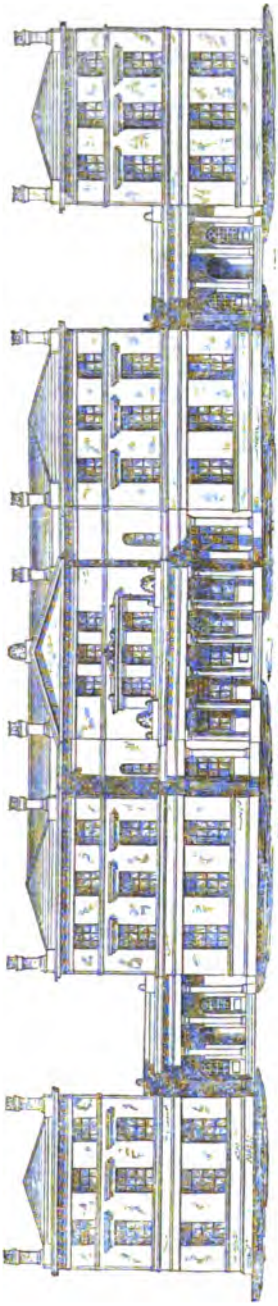


Fig. 121. *Elevation of Five Suburban Dwellings.*

The windows and doors have all dressings, though the engraver has omitted them, and the chimneys, which are in the exterior wall, have exterior projections, as well for strength as to indicate the existence of chimneys there architecturally.

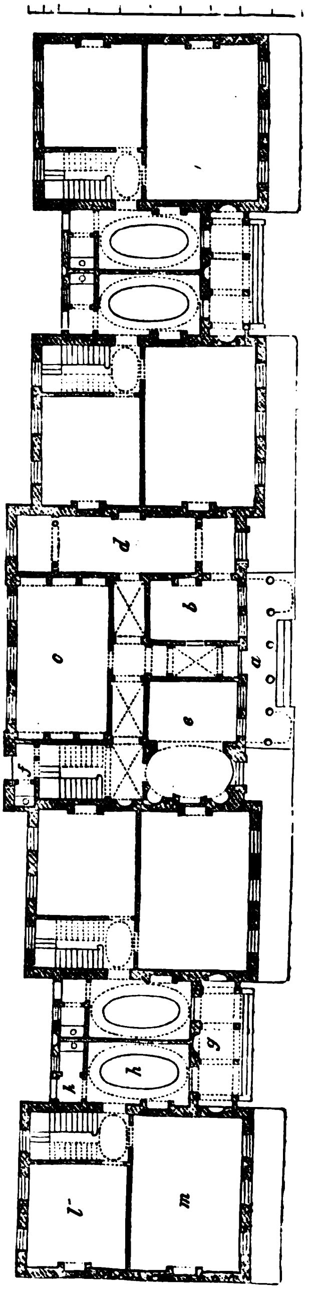


Fig. 122. *Enlarged Ground Plan of Five Suburban Dwellings.*

will be obtained when the library door is open, as the chimneypiece will form a handsome object for terminating the vista along the passage, and the pier-glass over it will reflect back the passage along its whole extent, up to the niche and statue at the farther end. The windows are one at each end, which will be found sufficient to light the whole room, notwithstanding its great length, as they are very wide. Between the columns and the front window is a door into the morning room or study (*b*).

The left-hand portion of the transverse passage has a niche at the end for the reception of a statue, and it conducts to the dining-room, staircase, garden door, basement, &c.

The dining-room (*e*) is 19 ft. by 14 ft., and consists of a square part lighted by two windows, and an elliptical part on the entrance end having a large window of painted glass at one end, and the door at the other; the fireplace is in the centre of the flat side of the elliptical end, but formed so as to dispense with a projecting chimney-breast, as that would interfere with the simplicity of the curved form. The flue, which is 9 in. by 14 in., may be carried up in the 18 in. wall, without any such addition; and the projecting jambs for receiving the grate need not be higher than the mantel-shelf, and may be covered with marble, so as to form a bold chimneypiece. There are two large niches on each side of the fireplace that will contain groups of statuary, or articles of furniture. The elliptical portion of the room is to have a domed ceiling, which will be separated from the flat ceiling of the square part by an elliptical arch. The effect of this room will be novel, most likely pleasing, and certainly very picturesque. The form is the result of necessity, the difficulty being to arrange in any other manner the unequally-sized and arranged windows. The sideboard can stand in the square part, opposite the windows, which will leave room for a good large dining-table, that may have the end nearest the fireplace semicircular.

The staircase is to be of stone, and to have a massive metal balustrading. It will be lighted by a skylight, and a window on each of the chamber floors. Under the chief flight of stairs, there must be a descent of three steps to a landing (*f*), where will be the staircase to the offices in the basement, and the garden door entering into a covered porch, having the garden in front and a water-closet on the left hand.

The other houses have porticoes (*g*), each formed by two engaged and two isolated antæ, and approached by three steps that are between the antæ, and each portico serves as the entrance to two dwellings. The doors are opposite the side intercolumniations, and in the centre and at each end of the pronaos is a niche in the wall for the reception of a statue. All these houses have the same accommodation. From the portico, the entrance is into a hall (*h*) 16 ft. by 10 ft., communicating with the staircase and the body of the house by an open archway, and with the garden porch (*k*) by a glazed door. The ceiling of the hall is groined, and has a large compartment coved, within which is an ample skylight of the same form, indicated by the inner oval dotted line. The fireplace is on the right hand in two of the houses, and on the left hand in the other two. The staircase is of the same kind as that described for the centre house, except that the ceiling under the landing is groined in the same manner as the entrance hall. (See the small dotted oval in the plans.) The doors into the principal rooms are from the foot of the stairs.

The dining-room is 16 ft. long and 15 ft. 6 in. wide; it is lighted by two windows in the side, looking into the garden, and has the fireplace at the end opposite the door.

The drawingroom (*m*) is 25 ft. by 17 ft., lighted by three windows in the side, and having the chimney-piece in the centre of one end, and a niche opposite to it [overlooked by the engraver when reducing this small plan from the large one]. There will be no occasion for chimney-breasts to any of the rooms, as the fireplaces and flues may be all constructed in a manner similar to those in the dining-room of the centre house.

The kitchen and offices are in the basement, and the staircase from them is brought up under the principal stairs. The water-closet is entered from the garden porch.

The external sides of the houses are all alike, and are very plain (see *fig.* 121.). There is on the chamber floor one window in the centre to give light to a small bed or dressing room; and there is on each side of it a niche for the reception of statues. The chimneys rise in the centre and form a bold pedestal that is connected with the angular blocks by gradetti. This pedestal is surmounted by an enriched band or crowning, sculptured with honeysuckle and lotus, as shown in *figs.* 123. and 124.

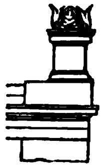


Fig. 123. *End View of the Chimney-tops.*

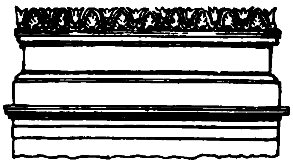


Fig. 124. *Side View of the Chimney-tops.*

The Gardens for the Five Suburban Dwellings. — The whole plot of ground in this design consists of two acres and a quarter; each of the buildings having one rood and a half, of which one rood is devoted to the pleasure-garden, and the remainder occupied by the stable-yard, site of dwelling-house, and the front garden.

This plan is not arranged with regard to any particular aspect, as the terrace must be placed parallel to the general line of road on which it verges. On this account, the gardens are laid out so as to be suitable to any locality, by merely shifting a few of the flower-beds to the most sunny parts, if the places shown for them happen to be too much in shade: this may be done without deranging the general plan.

The ground is supposed to be level, but a slight rise or a few inequalities will not be injurious. Each garden is laid out differently, so five designs are given in this one plan (*fig.* 120.) for the arrangement of the grounds attached to suburban residences placed in rows of this description.

The front garden is common to all the houses, and the entrance is at either end through a wide carriage gateway, by a 13 ft. road that sweeps boldly round to the front of the terrace. No flower borders are here introduced, as it is doubtful whether the inhabitants of the houses could be brought to agree among themselves to bear the expense of proper cultivation. If such an arrangement could be made, they might be introduced with good effect.

The gardens could not be equally apportioned, owing to the houses being placed at some distance from the side walls, which gives the end ones more than the rest; although, to obviate this difficulty, the separating walls have been made to bend away from the centre as much as could be ventured upon.

The garden *a* has a walk 6 ft. 6 in. wide, that conducts from the back doorway, in a serpentine line, to the farther end of the ground, sweeping in its course round a thicket of shrubs, that serves to conceal from the house the farther part of it, and thereby leaves to the imagination the task of determining the extent of the lawn in that direction. At the further end of the ground the walk bends suddenly round, and runs parallel to the yard wall for a short distance; here it must be sunk about a foot, that it may not be visible from the windows of the dining-room; and the turf on each side must slope gently down to it in a natural manner. The shrubbery, formed against the yard wall for the purpose of a screen, must be of evergreens, and may or may not be faced out with flowers. From this part there is an entrance to the stable-yard. The main walk now takes a direction homeward between the boundary wall and a close screen of shrubs, which conceals it from the house and from the other parts of the garden. The wall may be covered with Irish ivy, if the aspect is such as will not allow of flowering creepers growing freely against it, but it must be well covered with leafage of some kind; and the border against it, which is 18 in. wide, must be kept well stocked with such hardy herbaceous plants as will thrive in so shady a situation. The walk now ends in that which conducts from the back door to a gate in the front fence, through which it passes to the front garden. The junction of the two walks is not visible from the dining-room, and the last-mentioned walk is made to curve boldly round the house, to give an idea of extent in that direction.

The flower-borders introduced on the lawn must be kept very neatly, and always well stocked, and the outline of each preserved with great care.

The area may either have a perpendicular wall against the garden, or a sloping one of large rough flint, in the interstices of which specimens of the cistus and other small rock plants may be introduced with good effect, as they will be seen from the dining-room windows.

The yard contains a fuel-house, shed, coach-house, and three-stalled stable, with loft and man's sleeping-room over it. The coach entrance to the yard is from a back road that runs parallel to the entrance road.

The garden *b* is laid out with more formality than is the preceding design. One broad gravel walk runs in a straight line from the back door of the house, to the stable yard, and communicates with it by an ornamental arched gateway, the effect of which, as the terminating object of a straight pathway, is good, as may be seen in the Horticultural Gardens at Chiswick and elsewhere. On each side of this walk is turf, bounded by shrubbery, and having flower borders cut out upon it. The first objects from the house are, a long bed on one side, and a parterre on the other adjoining the kitchen area. The second feature presented is a mass of flowers and shrubs on each side, made to look as if they were arranged on stands, by being planted in earth thrown up in a regular form, at the highest angle it will retain against the wall; and, if these are neatly kept, an effect of high cultivation will be produced, that will be very pleasing so near to the dwelling-house, and in so small a garden. The walls above and on each side must be covered with flowering creepers, placing those that are evergreen nearest to the house. Beyond these flower-banks are projecting thickets of evergreen shrubs, that partially shut off the lower part of the garden, for the purpose of increasing its apparent magnitude. At a little distance from these is a walk that leaves the main one at a right angle, and conducts to a seat, and thence running between the boundary wall and a close shrubbery, reenters it again at the bottom of the garden. Wherever the walls have a shrubbery close against them, they are to be covered with Irish ivy.

The garden *c* is not larger than the rest, though belonging to the centre house, which is the principal of the range. It is laid out in a uniform manner. The area is skirted by a straight walk, from which springs a semicircular one. The space enclosed between them is taken up with parterre work of a radiating pattern, on turf. From the circumference of this, opposite to the centre, is a straight walk terminating in a circle of gravel, having for its centre a fountain, if such is attainable; if not, a statue, a sun-dial, a stone flower-stand, or some other interesting artificial object. The lawn on each side of this walk is cut off from the rest of the garden by an evergreen thicket, which serves to conceal the direction of the walks that leave the gravelled circle, and likewise the extent of the ground beyond. At the point of these thickets, next the walk, are to be placed handsome vases, containing aloes or yuccas; and, in the nook that is formed between the thicket and the wall, other vases of a larger description, on rich architectural flower-stands. These various objects, so arranged, will be found to group well together; and the effect of some being immediately backed with foliage, and the others open to the scenery beyond, will be highly picturesque; and the whole will have a character of richness and elegance, as seen from the windows of the drawingroom, that cannot fail to please. This character will be kept up and increased by the flower banks, climbing roses, and choice creepers, against each of the division walls; and by the walls themselves having small tazzas containing flowering plants placed on them at equal distances, around which, so as partially to conceal them, the roses might be allowed to grow. The farther part of the garden is of a less artificial character. The walk leaves the gravelled circle on one side, and, after skirting round between the shrubbery and the foliage-clad walls, reenters on the opposite side. The walk at the end of the garden must be sunk, so as not to be visible from the windows of the principal floor of the house, that apparent extent may be given to the premises, by not displaying the junction of the two walks that leave the gravelled circle in opposite directions. The imagination will supply the connexion, and no doubt picture it as being at a considerable distance off; most likely beyond the yard and stable buildings. Against the yard wall a flower bank is to be placed, having lofty shrubs to form the back of it.

The garden *d* is laid out with great simplicity. The walk leaves the back door of the house in a serpentine manner, sweeping round a clump of shrubs that abuts against the division wall, and which serves to intercept the view of the farther part of the walk, and leaves the mind to supply, by imagination, its subsequent direction, and the extent of the demesne on that side. Yet it continues in fact almost in a straight line, following the wall to the farther end of the ground, then turning sharply along by the yard wall, where it is sunk in a manner similar to those at the extremity of the other gardens, and continues skirting the side wall, and finally falls into itself just by the clump spoken of before. Two vases may be introduced in this garden with good effect, as they will combine well with the tazzas placed on the wall between it and garden *c*. The walls, where not concealed by shrubbery, are to be covered with creepers, and two raised earth flower banks are to be placed against them near to the house.

The garden *e* is the same size as garden *a*, and is laid out in a similar style. The walk which from the dining-room appears to be the main one sweeps directly from the back door, round the house, to the gate in the fence parting off the front garden. This circuitous direction will afford great play to the imagination in determining the boundary of the premises, especially as but one walk branching from it can be seen from the windows at the back of the house, and that, from its going off by the side of the wall, will appear requisite, and, from its not being again visible (it being sunk where it crosses the lawn) will rather add to, than detract from, the apparent magnitude of the demesne. The walk that conducts round the garden is, for the most part, planted off from the lawn, and entirely so from the house. The parterre is radiating and placed round the circular walk; and the other flower beds between the walk and the area are continued round the corner of the house; all which will further the idea of the principal part of the grounds being also in that quarter; and this, combined with the open vista which is visible along the lawn, will present from the dining-room windows the effect of what may be considered, for a suburban residence, a very extensive garden.

ART. X. *What Gardeners might learn by attending to the Habits of Birds.* By JOHN DUNLOP.

MUCH rational amusement might be found by gardeners in studying the habits of birds and insects, instead of frequenting the pot-house, as many of them do. Although I have been a strict observer of nature for years, yet there is scarcely a week passes in which I do not discover something which I before knew nothing of. For some weeks past I have been much amused with a pair of wrynecks (*Yúnx* Torquílla), which had nestled in the hole of a tree in our garden, where they hatched four young ones. In a few days afterwards I found several shells of the common snail (Hèlix nemoràlis) lying around the tree, which daily increased in numbers. I had the curiosity to watch the old ones, never before having heard of their feeding their young upon snails, and I was truly astonished at the dexterity with which they would lay the shell upon the ground and open it, in the manner of those which I have sent you. Ninety of these shells have they emptied under the tree, and many more they must have destroyed elsewhere. This was before they took wing; how many more they will require before they can feed themselves I know not. But what I have seen is well worth the attention of gardeners, who often destroy them for amusement upon their first arrival in this country; and for want of knowing that they are truly the gardener's friend, and ought to be protected by them. It was truly amusing to see the parents, after the young were fully fledged, trying by every means to induce them to leave the nest and take wing; they would sit upon the tree within sight of the hole, with a snail in their mandibles, twisting their necks in a thousand fantastic forms, to induce their young ones to come out. They have at last succeeded; they are gone, and I am afraid I shall see no more of them before next April, when I expect they will again pay me a visit.

Worcester Park, Aug. 7. 1843.

ART. XI. *Botanical, Floricultural, and Arboricultural Notices of the Kinds of Plants newly introduced into British Gardens and Plantations, or which have been originated in them; together with additional Information respecting Plants (whether old or new) already in Cultivation: the whole intended to serve as a perpetual Supplement to the "Encyclopædia of Plants," the "Hortus Britannicus," the "Hortus Lignosus," and the "Arboretum et Fruticetum Britannicum."*

Curtis's Botanical Magazine; in monthly numbers, each containing seven plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Sir William Jackson Hooker, LL.D., &c., Director of the Royal Botanic Garden, Kew.

Edwards's Botanical Register; in monthly numbers, new series, each containing six plates; 3*s.* 6*d.* coloured, 3*s.* plain. Edited by Dr. Lindley, Professor of Botany in the University College, London.

Paxton's Magazine of Botany, and Register of Flowering Plants; in monthly numbers; large 8vo; 2*s.* 6*d.* each.

Dilleniàceæ.

2185. CANDO'LLEA [1843, 50.
tetrándra *Lindl.* tetrandrous ■ ⊔ or 7 jn Y Swan River 1842. C s.p.l Bot. reg. for

This is a very handsome greenhouse shrub, with both its leaves and flowers nearly twice as large as those of the common species. It has been already noticed, p. 445. The name alludes to the stamens being disposed in four very distinct bundles. The species is remarkable for the bright orange colour and large size of the aril of its seeds, which is nearly as much cut as that of the nutmeg; and, in fact, bears considerable resemblance to mace. It is a hardy greenhouse plant, of very easy culture, which will flower freely in a pot, though it blows better when planted out in a bed. In all cases care should be taken to keep the collar above ground, as it is very liable to suffer from damp during winter. "Water should be liberally given during the summer months, and plenty of air at all times when the weather permits, applying no fire-heat except to keep off frost. It is readily propagated by cuttings under ordinary treatment." (*Bot. Reg.*, Oct. 1843.)

Caryophyllàceæ.

3670. VISCA'RIA
oculàta *Lindl.* *dark*-eyed ○ or 2 su Pk Algiers 1843. S co Bot. reg. 1843, 53.

This plant bears considerable resemblance to the common annual Agrostémma Cœ'li-*R*òsa, but it has a dark eye, and "its petals have a short and slightly emarginate appendage, and not a long bifid one. In the form of the calyx there is this difference, that in the plant before us it contracts suddenly about the middle, while in Cœ'li-*Rósa* it narrows very gradually. Furthermore, the surface of the seed-vessel here is rough, with fine granulations, but in Cœ'li-*Rósa* it is smooth." This plant is a hardy annual, requiring the usual treatment of plants of that kind. Its seeds were gathered on dry hills, about thirty miles from Algiers, and it flowered for the first time in this country in the nursery of Messrs. Backhouse at York. (*Bot. Reg.*, Oct. 1843.)

Malpighiàceæ.

Stigmaphýllum jatrophæfòlium Adr. de Jus. This is a pretty stove plant, producing abundance of yellow flowers and palmated leaves. (*Bot. Reg.*, Aug. 1843, Misc.)

M*eliàceæ.*

Turræ'a *lobàta* Lindl. A very curious stove shrub from Sierra Leone. It has white flowers, about the size of those of the orange tree. (*Bot. Reg.*, Sept. 1843, Misc.)

Tropæolàceæ.

1148. **TROPÆ'OLUM** 9317 **polyphýllum** *Bot. mag.* t. 4042; and *Paxt. mag. bot.* vol. x. p. 175.

This pretty species of Tropæ'olum, though marked in the *Hort. Brit.* as introduced in 1827, is stated in the *Botanical Magazine* to have been only "lately introduced" into this country; and in *Paxton's Magazine* it is said to have been introduced in 1839. It is a very pretty plant, producing a great abundance of bright yellow flowers and small, palmated, glaucous leaves. (*Bot. Mag.*, Oct. 1843; and *Paxt. Mag. of Bot.*, Sept. 1843.)

R*utàceæ.*

ERYTHROCHI'TON *Nees et Martius.* RED-COAT. (From *eruthros*, red, and *chitōn*, a coat.)

brasiliénsis *Nees et Martius* Brazilian ♀ ▭ or 10 jl W Brazil 1842. C s.l [1843, 47. Bot. reg.

This plant forms a small tree about 10 ft. high, "with the habit of a Theophrásta, the stem being altogether unbranched, and the long leathery leaves collected at one end." The flowers are white with red calyxes, and hence the name of the genus, which signifies red-coat. It is found in "close shady places in the virgin woods of Brazil, preferring a granitic soil;" and it flowered at Syon for the first time in Europe. "It is one of those fragrant trees of the tropics whose foliage is filled with a sweet volatile oil, like that of the orange, and whose aromatic tonic bark is valuable as a remedy for the fevers of such countries." (*Bot. Reg.*, Sept. 1843.)

Leguminòsæ.

1964. *CY'TISUS*

Weldènii Jacq. *Baron* Welden's ▲ or 10 ap.my Y Dalmatia 1840. C co Bot. reg. 1843, [40.

This very beautiful species of Cýtisus differs from the laburnum in its flowers growing in short erect racemes, instead of in long drooping ones. Its leaves are so like those of the laburnum that it can scarcely be distinguished from that plant when not in flower. It is exceedingly poisonous, and even the smell of its flowers is said to produce the headache. It has been frequently alluded to in this Magazine, and is described and figured in the *Encyclopædia of Trees and Shrubs*, fig. 343. (*Bot. Reg.*, Aug. 1843.)

2837. *A*CA'CIA

rotundifòlia *Hook.* round-leaved ♣ ⊔ or 3 ap Y New Holland 1842. C s.p.l Bot. mag. [4041.

This species was found near Hunter's River by Mr. James Backhouse, during his very interesting travels in New Holland. "It is a straggling plant; but when trained upon a trellis in a garden-pot it makes a very elegant appearance with its graceful drooping branches and copious heads of blossoms, more copious than the leaves." (*Bot. Mag.*, Sept. 1843.)

20363. **spectábilis** *Bot. Reg.*, 1843, 46.

Dr. Lindley observes of this plant, that "the leaves and branches are covered with the most delicate bloom, and the flowers, produced in large masses at the ends of the shoots, are of the clearest and softest yellow." He adds, " that it belongs to the same section of the genus as *A.* díscolor and *A.* dealbàta," but that it is probably more tender than they are, as it is a native of a warmer latitude. It is easily distinguished by its broad, smooth, glaucous leaflets, and by the gland found in those species in connexion with the petiole being replaced by a depression." (*Bot. Reg.*, Sept. 1843.) This species was before alluded to in p. 500.

2059. LIPA'RIA
párva *Vogel* small ⚘ ⊔ or 2 mr.ap Y Cape of Good Hope 1840. C co Bot. mag. 4034.

This is a small erect shrub, with very handsome heads of golden yellow flowers. (*Bot. Mag.*, Aug. 1843.)

3581. LABICHÆ'*A* [bot. vol. x. p. 149.
bipunctàta *Paxt.* two-pointed ⚘ ⊔ or 3 mr.ap Y Swan River 1840. C s.p Paxt. mag.

A pretty little greenhouse shrub with bright golden yellow flowers, somewhat resembling those of Eùthales macrophy̆lla, and requiring the usual treatment of New Holland undershrubs. " The species is named bipunctàta, on account of some of the leaves having their points split into two. This characteristic is, however, by no means general, and looks almost as if the point had been split artificially." (*Paxt. Mag. of Bot.*, Aug. 1843.)

1260. GASTROLO'BIUM
acùtum *Hook.* acute ⚘ ⊔ or 1½ mr Y.R Swan River 1842. C s.l.p Bot. mag. 4040.

A pretty little greenhouse shrub, raised from seeds sent from the Swan River to the Kew Garden by Mr. Drummond in 1842. (*Bot. Mag.*, Sept. 1843.)

*Brongniárt*ia *sericea* Schlech. " A downy shrub ; when out of flower looking something like an amorpha, with leaves pubescent on the midrib and beneath, but smooth above when full grown. The leaves are pinnate, and the flowers of a dingy purple, the petals being almost hidden by their large green calyx. The plant " has little beauty, and is too tender for the climate of London." (*Bot. Reg.*, Sept. 1843, Misc.)

Sphærolòbium acuminàtum Benth. " A little Swan River shrub, with rush-like stems, and whorls of orange-red papilionaceous flowers." (*Bot. Reg.*, Aug. 1843, Misc.)

Rosàceæ.

Lindlèya me*spiloìdes* Humb. et Kunth. This rare plant, which is a native of Mexico, has lately flowered in the Horticultural Society's Garden. It is an evergreen tree, with " something of the appearance of *C*ratæ'gus mexicàna, but has a dry capsular fruit." (*Bot. Reg.*, Aug. 1843, Misc.)

Onagràriæ.

1188. FU'CHS*IA* [vol. x. p. 151.
exoniénsis *Paxt.* Exeter ♣ ⊔ or 4 jl.au C.P hybrid 1842. C r.m Paxt. mag. bot.

This is a very handsome hybrid, raised by Mr. Pince of the Exeter Nursery, between F. cordifòlia and F. globòsa. The flowers are large, with a long tube, and of the most brilliant colours. (*Paxt. Mag. of Bot.*, Aug. 1843.)

Myrtàceæ.

1493. EUCALY'PTUS [L s.p Bot. mag. 4086.
splachnicárpon *Hook.* Splachnum-fruited ♀ ⊔ or 16 Y ap.jl King George's Sound 1840.

This is a very handsome plant, which, in British gardens, only attains the height of about 16 ft. ; but which, in its native country, is said to become an immense tree. The flowers are the largest of the genus. (*Bot. Mag.*, Sept. 1843.)

Hypocalýmna angustifòlium Endl. " A charming sweet-scented greenhouse shrub, raised from Swan River seeds by Messrs. Pope and Sons of the Handsworth Nursery, Birmingham." The flowers are white. (*Bot. Reg.*, Aug. 1843, Misc.)

Verticórdia densiflòra Lindl. A little heath-like shrub, belonging to the fringe myrtles of New Holland, with corymbs of delicately formed pink flowers ; but they are not bright enough, nor in sufficient mass, to produce a striking effect. (*Bot. Reg.*, Oct. 1843, Misc.)

Cactàceæ.

1475. **RHI'PSALIS**
brachiàta *Hook.* brachiate m. ⊔ cu ½ mr W Buenos Ayres 1843. C s.p Bot. mag. 4039.

A curious species of this genus, with numerous branches very close together. The flowers are small, and not showy. (*Bot. Mag.*, Sept. 1843.)

R*ubiàceæ.*

638. **GARDE'N*IA*** **[Bot. mag. 4044.**
Sherboúrniæ Hook. *Mrs.* Sherbourne's L □ or 3 jn W.R Sierra Leone 1842. C co

A very handsome species of the Cape jasmine, characterised by the deep crimson inside the mouth of the tube of the corolla. It is a native of Sierra Leone, and requires the usual treatment of stove shrubs. (*Bot. Mag.*, Oct. 1843.)

Rándia oxypétala Lindl. This species of Ránd*ia* is a native of India. " It forms a dense and somewhat spiny shrub, with shining, small, oval, densely crowded leaves ; and solitary, terminal, stalkless flowers, which are yellowish and sweet-scented." It is rather tender in the neighbourhood of London. (*Bot. Reg.*, Sept. 1843, Misc.)

Compósitæ.

2451. ***OTHO'NNA*** **22343 frutéscens *Bot. Mag.* 3967.**
2335. ***SENE'CIO*** **[mag. 4011.**
calamifòlius *Hook.* reed-leaved m. ⊔ or 1 au Y Cape of Good Hope 1730. C s.p Bot.

This species is remarkable for its fleshy succulent leaves, which resemble those of a mesembryanthemum. Its flowers are large and yellow, and are produced in great abundance. (*Bot. Mag.*, April, 1843.)

BARNADE'S*IA* Lin. fils. (Called after *Michael Barnadez*, a Spanish botanist.) [1843, 29.
ròsea *Lindl.* rose-coloured m. ⊔ or 1 my Pk South America 1840. C s.p.l Bot. reg.

This very singular genus consists of small plants, natives of South America, which, in their native country, form spiny bushes, with very singularly shaped flowers. This species requires a warm greenhouse, in which the temperature during winter averages 47°. The plant is very liable to suffer from damp. (*Bot. Reg.*, June, 1843.)

Corvisártia índica Dec. " This is a coarse herbaceous plant, with large heads of yellow flowers, in all respects extremely similar to the elecampane." The species is a native of Cashmere and other parts of the North of India. (*Bot. Reg.*, Aug. 1842, Misc.)

A'ster cabùlicus Lindl. This is a small half-shrubby bush, which is quite hardy, and has rough willow-like leaves. The whole plant smells like wormwood, and the flowers, which are at first white, become afterwards of a pale lilac. (*Bot. Reg.*, Sept. 1843, Misc.)

Lobel*iàceæ.*

3646. **SIPHOCA'MPYLOS** **[3973, and Paxt. mag. bot. vol. ix. p. 223.**
***b*etulæfòlius *G. Don* Birch-leaved ⸙ □ or 3 jl R.Y Brazil 1840. C. co Bot. mag.**

The flowers of this plant bear considerable resemblance to those of S. bícolor. The leaves are, however, much handsomer than those of that species. The stem is rather suffruticose than shrubby, as it is frequently only woody at the base. It has, as yet, only been tried in a stove, but will probably prove quite as hardy as S. bícolor, and it has the same peculiarity of remaining a long time in flower. This species is a native of the Organ Mountains of Brazil; and it is stated by Sir William Hooker that it flowered for the first time in Europe in Kew Garden in July, 1842; but in *Paxton's Magazine* it is stated that it was in flower some months previous to that time in the Epsom Nursery. (*Bot. Mag.*, Oct. 1842; and *Paxt. Mag. of Bot.*, Nov. 1842.)

[4015.
longipedunculàtus *Pohl* long-stalked ⸙ □ or 3 ja R.Y Brazil? 1840. C co Bot. mag.

This plant has not such showy flowers as either of the other species ; but it is remarkable for the length of its peduncles. " The stems are long and trailing rather than climbing, and should be fastened to a wire trellis, when the plant makes a handsome appearance." Sir W. Hooker adds that his specimen "flowered in January, 1823;" but this is probably a misprint for 1843, as the plant does not appear to have been in the country twenty years. (*Bot. Mag.*, May, 1843.)

Campanulàceæ.

607. CAMPA'NULA
Lœflingii Lœfling's ⊙| or ♁ jl P Portugal 1842. S r.m Bot. reg. 1843, 19.

This is a very beautiful little plant, which requires protection during winter, if sown in the autumn; and plenty of air if sown in the spring, and kept in a cold frame, "as the plants are very delicate and apt to damp off. It may be grown in the open border, if planted in a warm and dry situation after the danger of spring frosts is over." It is a very valuable plant for either a pot in a greenhouse or a box in a balcony, from the great abundance of its blossoms, and the long time it continues in flower. (*Bot. Reg.*, April, 1843.)

[p. 31.
grándis *Fisch. et Mey.* large △| or 3 au P Natolia 1842. D co Paxt. mag. bot. vol. x.

This is a very handsome plant with the habit of growth of C. pyramidàlis, but with larger and more showy flowers. The flowers, indeed, are sometimes as much as 3 in. across. The plant requires the same treatment as C. pyramidàlis, but it has the advantage of blooming splendidly when kept in small pots, when the height of the flower stems does not exceed a foot or 9 in. When treated like C. pyramidàlis, the plant is still stronger and more robust, and the flower stalk frequently grows 4 ft. high. (*Bot. Reg.*, June, 1842, Misc.; and *Paxt. Mag. of Bot.*, March, 1843.)

1698. GE'SNERA discolor *Lindl.*; Gesnèria polyántha *Dec.* Bot. mag. 3995.

ACHIME'NES [4012.; and Paxt. mag. bot. vol. x. p. 145.
grandiflòra *Dec.* large-flowered △ ⌴ spl 1 jn Ro Mexico 1842. C r.m Bot. mag.

This very splendid species was first discovered in Mexico, whence it was sent to the Continent, and afterwards reached England through Ghent. It should be cultivated like the other lately introduced plants of this genus; and, according to *Paxton's Magazine*, it "requires a light nutritive soil composed of fresh loam and a large proportion of leaf mould, or a somewhat less amount of decayed manure. It must not be stinted for pot room, and should be started into growth in a stove or pit supplied with bottom heat, where it may be kept till it is about to flower. When in a flowering state, it may be gradually removed to a warm greenhouse or cool stove, where it will bloom profusely." (*Paxt. Mag. of Bot.*, Aug. 1843; *Bot. Mag.*, May, 1843; and *Bot. Reg.*, Aug. 1842, Misc.)

multiflòra *Gard.* many-flowered ⊡ pr 1 au P Brazil 1842. S co Bot. mag. 3993.

This species, though not so showy as most of those lately introduced, is yet very pretty, and has a singular appendage on the limb of the corolla: in other respects, it bears so much resemblance to some of the kinds of Gloxínia that it might easily be mistaken for a species of that genus. (*Bot. Mag.*, Jan. 1843.)

hirsùta Lindl. A very handsome species with large, rich, rose-coloured flowers; a native of Guatemala. (*Bot. Reg.*, Oct. 1843, Misc.)

1702. GLOXI'N*IA*
tubiflòra *Hook.* tube-flowered ⊠ cu ♁ au W South Brazil 1841. D co Bot. mag. 3971.

This is a very singular species, from the great length of the flower tube, which is often 4 in. long. The flowers are white and downy, and they are produced in very great abundance. The plant partakes more of the habit of a Gesnèr*ia* than of a Gloxín*ia*. (*Bot. Mag.*, Oct. 1842.)

1797. COLU'MN*EA*
spléndens *Paxt.* splendid ⌇ ☐ cu 2 n S Brazil 1841. C co Paxt. mag. bot. vol. x. p. 5.

This species is also called Colúmn*ea* grandiflòra and Nematánthus Guillemin*iàna*, and it certainly appears to belong to the latter genus in the shape of its flowers. The leaves are thick and fleshy and of a very bright green, and the lower part of the branches is covered with a nearly white, smooth bark, which has a very striking effect when contrasted with the intense green of the leaves and the deep scarlet of the flowers. Its habit of growth is evidently to become pendent, but it may be treated as a sort of low climbing shrub, and it will probably "blossom occasionally throughout the whole year." (*Paxt. Mag. of Bot.*, Feb. 1843.)

NEMATA'NTHUS *Dec.* (From *nēma*, a thread, and *anthos*, a flower; thread-like peduncles.)
lóngipes *Dec.* long-peduncled ♄ ☐ cu 2 d S Brazil 1841. C co Bot. mag. 4018.

This appears to be the same plant as that figured under the name of Colúmnea spléndens in *Paxton's Magazine*, and, if not the same, is evidently very nearly allied to it, and requires the same treatment. It has flowered in December, January, and May. (*Bot. Mag.*, June, 1843.)

HYPOCY'RTA *Mart.* (*Hupo*, beneath, and *kurtos*, gibbous; a projection of one side of the corolla.)
[mag. 4047.
strigillòsa *Mart.* rough-*leaved* ⊠ cu 2 my S.Y Organ Mountains 1842. D co Bot.

This is another of the numerous plants for which the botanical world is indebted to Mr. Veitch of Exeter, and which he has imported from Brazil. The present species is, however, more curious than beautiful, as its corollas, from their peculiar shape, have the appearance of being deformed. (*Bot. Mag.*, Oct. 1843.)

Drymònia punctàta Lindl. "This curious plant has the habit of a Sinnfngia with a creeping stem, and it was introduced from Guatemala by M. Hartweg." The flowers are of a pale cream-colour, and the leaves of a light green with a crimson midrib. (*Bot. Reg.*, Sept. 1842, Misc.)

Ericàceæ.

1339. *R*HODODE'NDRON
fràgrans *Paxt.* fragrant ♄ ⊔ pr 3 my Li hybrid C s.p Paxt. mag. bot. vol. x. p. 147.

This is said to be a plant raised by Messrs. Chandler more than twenty years ago, and it appears to be the same as that generally called *R.* azaleöìdes, see *Hort. Brit.* (*Paxt. Mag. of Bot.*, Aug. 1843.)

Rollisòn*ii* Lindl. Bot. Reg. 1843, 25.

This is a garden variety of *R.* arbòreum, "remarkable for its deep-red flowers and the closeness with which they are arranged." It is more tender than the common tree rhododendron. (*Bot. Reg.*, May, 1843.)

521. AZA'LEA 4341 indica var. *Bot. Reg.* 1842, 56.

This beautiful double red azalea was imported from China by W. Wells, Esq., of Redleaf. It is much handsomer than any of the double-flowering kinds that have been originated in this country. (*Bot. Reg.*, Oct. 1842.)

1173. *E*RI'CA
Neill*ii* Paxt. *Dr.* Neill's *hybrid.*

This a hybrid between *E.* aristàta and *E.* linnæ*öìdes.* It is an elegant plant, with deep-pink flowers softening into white in the limb. (*Paxt. Mag. of Bot.*, Oct. 1842.)

Pìeris ovalifòlia G. Don. A fine evergreen shrub, a native of the north of India, having white flowers tinged with pink. (*Bot. Reg.*, July, 1842, Misc.)

COMAROSTA'PHYLIS *Endl.* (*Komaros*, the arbutus, *staphylis*, a bunch of grapes.) [1843, 30.
*a*rbutöìdes *Lindl.* Arbutus-like ♄ ⊔ pr 6 o my W Guatemala 1840. C s.p Bot. reg.

This plant very much resembles an *A*rbutus, but the fruit, instead of being many-seeded, is a 5-celled drupe. The plant is a pretty, half-hardy, evergreen shrub growing 5 or 6 feet high, and flowering abundantly. (*Bot. Reg.*, June, 1843.)

MACLEA'N*IA* *Hook.* (In honour of *John Maclean, Esq.*, of Lima.)
angulàta *Hook.* angled-*flowered* ♄ ☐ or 3 jn S.Y Peru 1842. C co Bot. mag. 3979.

A very handsome stove shrub with the habit of Thibaùd*ia*. The flowers are of brilliant colours, and are produced in great abundance. (*Bot. Mag.*, Nov. 1842.)

Ebenàceæ.

2889. *D*IOSPY'ROS 25185 edùlis; *D*iospỳros *Sapòta* Roxb. Bot. Mag. 3988.

Jasmìneæ.

Jasmìnum subulàtum Lindl. A Chinese shrub with yellow flowers. (*Bot. Reg.*, Aug. 1842, Misc.)

Apocynàceæ.

537. *E*CHI'TES [reg. 1843, 27; and Paxt. mag. bot. vol. ix. p. 199.
atropurpùrea *Lindl.* dark purple ⌊ ▭ or 10 jl D.P South Brazil 1842. C s.l.p Bot.

This is an exceedingly graceful plant with slender climbing stems, and very dark purple flowers. "In cultivation it requires the temperature of a stove, and may be trained to the rafters of the house, or to a wire trellis spread entirely over the roof." Care should be taken not to suffer it to become too wet. "From the weakness of its shoots, it will need pruning in the winter, and may perhaps be improved by having its branches stopped while they are growing. It is not till after a specimen has been established for two or three years that it acquires the ornamental character which naturally belongs to it, but it then blossoms throughout the summer in the greatest prodigality." (*Paxt. Mag. of Bot.*, Oct. 1842; and *Bot. Reg.*, May 1843.)

[mag. 3976; and Paxt. mag. bot. vol. x. p. 25.
spléndens *Hook.* splendid ⌊ ▭ or 10 jl o Ro Organ Mountains 1841. C s.l.p Bot.

This is one of the most splendid climbing plants in British hothouses, and it appears likely to flower nearly all the summer, as a specimen in the stove at Mr. Veitch's Nursery near Exeter continued producing flowers from July to October, at which period the greater part of the leaves of the plant fell off with the flowers; thus proving that the plant was partly deciduous. The habit of the plant is very luxuriant; the leaves are of unusual size, and the flowers, which are borne in large clusters (expanding only one or two at a time), are each often 3 or 4 inches in breadth. After the leaves fall, the plant "should be kept in a state of rest through the months of November, December, and January." (*Paxt. Mag. of Bot.*, March, 1843; and *Bot. Mag.*, Nov. 1842.)

[mag 3997.
hirsùta *Ruiz et Pav.* hairy ⌊ ▭ or 10 s Y.Ro Organ Mountains 1841. C s.l.p Bot.

This species, though not so handsome as the preceding ones, is yet well deserving of cultivation, from the agreeable variety afforded by its colour, which is yellow tinged with rose. (*Bot. Mag.*, Feb. 1843.)

G*enti*aneæ.

LEIA'NTHUS *Grise.* (From *leios*, smooth, and *anthos*, a flower.) [mag. 4043.
nigréscens *Cham. et Schlecht.* blackish ◘ or 3 su Bksh Guatemala 1842. C co Bot.

This is a very remarkable plant from the colour and profusion of the flowers, which form a large panicle about 2 ft. high and 1½ ft. broad. A great many flowers "are in beauty at one time, and they continue in perfection a very long time, if kept cool and protected from the too powerful rays of the sun." In a shady greenhouse, the flowers of this plant "have been equally profuse and perfect for a period of four months." (*Bot. Mag.*, Oct. 1843.)

1706. BIGNO'N*IA* 15361 picta *Bot. Reg.* 1842, 45; and *Paxt. Mag. Bot.* vol. x p. 125.
28670. jasminöides, *Técoma* jasminöides *Bot. Reg.* 2002; and *Bot Mag.* 4C04.

This beautiful species, though figured in the *Botanical Register* so far back as 1837, having been accidentally omitted in the *Hortus Britannicus*, it has been thought advisable to give the reference to it in the *Botanical Register* here, on the occasion of its being again figured in the *Botanical Magazine* for March, 1843.

Convolvulàceæ.

3619. PHARBI'TIS [mag. bot. vol. ix. p. 243.
ostrìna *Lindl.* purple ⌊ ▭ or 20 su D.P Cuba 1839. O co Bot. reg. 1842, 51; Paxt.

This is a handsome species of Pharbìtis, producing abundance of its very dark flowers from May during the whole of the summer. It has the habit of a *Batatas.* "The roots are large and tuberous, the stem perishing every winter, but growing out rapidly in spring to the length of 20 ft. or more." (*Bot. Reg.*, Sept. 1842; and *Paxt. Mag. of Bot.*, Dec. 1842.)

IPOMŒ'A 4165 blánda; Ipomœ'a cymòsa *Choisy* Bot. Reg. 1843, 24. [3978.
Tweediè*i* Hook. *Mr.* Tweedie's ⫰ ⌴ pr 6 su Rsh P Parana 1838. C co Bot. mag.

A pretty little plant with heart-shaped leaves and small flowers. (*Bot. Mag.* Nov. 1842.)

Boraginàceæ.

445. *E'CHIUM*
petræ'um *Tratt.* rock ⫰ pr 2 my Pk.Li Dalmatia 1842. C s.l.p Bot. reg. 1843, 26.

This is a very gay little plant, from the brilliancy of the colours of its flowers, and the neatness of its leaves. It flowers freely in spring, "but it is very difficult to preserve through the winter, as it is very subject to damp off, even when the plants are old." (*Bot. Reg.*, May 1843.)

Solanàceæ.

583. *CE'STRUM* [4022.
viridiflòrum *Hook.* green-flowered ⫰ ☐ fra 2 au G South Brazil 1836. C co Bot. mag.

This species of *Céstrum* is remarkable for the delicious fragrance of its flowers, which is most powerful at night. The flowers are inconspicuous from their colour, but they are produced in great abundance, and remain on for several months. (*Bot. Mag.*, June 1843.)

Solànum concàvum Lindl. A handsome greenhouse climber, with narrow, concave, dark-green leaves, and panicles of violet-coloured flowers. It is a native of Chili, and has been several years in this country. (*Bot. Reg.*, Aug. 1842, Misc.)

Scrophularìneæ.

1717. PENTSTE'MON 15461 gentian*oìdes* var. spléndens *Paxt. Mag. Bot.* vol. ix. p. 175.

This is a variety raised from Mexican seeds, the flowers of which are much larger than those of the species, and of a more brilliant colour. (*Paxt. Mag. of Bot.*, Sept. 1842.)

TETRANE'MA *Benth.* (From *tetra*, four, *nēma*, a filament; but four, while Pentstèmon has five.)
mexicànum *Benth.* Mexican ⌊△⌋ pr 1 su Rsh P Mexico 1842. C co Bot. reg. 1843, 52.

This is a pretty little greenhouse plant, "quite peculiar in its appearance, in consequence of its almost stemless habit and the profusion of little corymbs" of showy flowers. It is rather tender, and should be kept nearly dry, in a house between a stove and a greenhouse, during winter. (*Bot. Reg.*, Oct. 1843.)

1789. DIGITA'LIS 15912 purpùrea var. supérba *Paxt. Mag. Bot.* vol. x. p. 29.

This is a variety with very large pinkish-white flowers, which have deep purple blotches in the lip. These blotches are very striking, and are rendered the more so by each having a rim of white round it. (*Paxt. Mag. of Bot.*, March, 1843.)

1808. SCHIZA'NTHUS
cándidus *Lindl.* white ⊙| pr 1 au W Coquimbo 1840. S co Bot. reg. 1843, 45.

The flowers of this species are of pure white, without a stain of any other colour, and the leaves are pinnatifid with the segments widely apart. (*Bot. Reg.*, Sept. 1843.)

472. *PHLO'X*
Van Houtte's garden variety, *Bot. Reg.* 1843, 5.

"This is a variety of remarkable beauty, looking as if P. suavèolens had been crossed with *P.* caroliniàna." It was raised by M. Louis Van Houtte, nurseryman of Ghent. (*Bot. Reg.*, Jan. 1843.)

Verónica *nívea* Lindl. This is a suffruticose plant with white flowers, a native of Van Diemen's Land. (*Bot. Reg.*, June 1842, Misc.)

Pediculàris megalántha Wall. This plant is rather pretty, from its large yellow flowers, which grow in long terminal spikes. The foliage, however, is rather pallid, which gives the plant an unhealthy appearance. (*Bot. Reg.*, Aug. 1842, Misc.)

Labiàtæ.

BE'CIUM Lindl. (" From *bèkion*, a name assigned by Dioscorides to the sage; resem*blance.*")
bicolor *Lindl.* two-coloured Ɛ. ⊔ or 2 au W Abyssinia 1842. C co Bot. reg. 1843, 15.

This plant, Dr. Lindley observes, " evidently belongs to the ocymoideous labiate plants, but does not agree with any of the published genera. Its singular calyx seems by itself to mark it sufficiently; independently of which, the plant differs from Plectránthus and its allies in the equal size of the two lips of the corolla; and from *O'*cymum and its allies in the long declinate stamens, distinctly bilabiate corolla, and whole habit." It is an ornamental greenhouse plant, with large white flowers having lilac veins, and long violet-coloured stamens. (*Bot. Reg.*, March, 1843.)

1693. SCUTELLA'RIA [vol. x. p. 99.
spléndens *L. K. et O.* splendid £ ⊠ or 2 au S Mexico 1841. C co Paxt. mag. bot.

The flowers of this species are as brilliant in colour as those of the common scarlet *V*erbèna. As yet it has only been kept in a stove, but it will probably prove as hardy as any of the other species. (*Paxt. Mag. of Bot.*, June, 1843.)

V*erbenàceæ.*

1738. LANTA'NA 15580 cròcea *Paxt. Mag. Bot.* vol. x. p. 53.

Scléroon oleinum Benth. This is a little Mexican shrub of no beauty, but which is said to have " the appearance of an Olive, the flowers of a *V*erbèna, and the name of *D*áphne." (*Bot. Reg.*, Sept. 1843.)

A*canthàceæ.*

61. ERA'NTHEMUM
montànum *Roxb.* mountain Ɛ. ☐ or 2 ap.my Li India 1840. C Bot. mag. 4031.

A very beautiful flowering shrub, which requires a stove in British gardens. The stems are somewhat weak, and the flowers are produced in the greatest abundance. (*Bot. Mag.*, Aug. 1843.)

Primulàceæ.

451. PRI'MULA 30555 denticulàta *Bot. Reg.* 1842, 47; and *Bot. Mag.* 3959.

450. *A*NDRO'SACE
lanuginòsa *Wall.* woolly-*leaved* △ pr ½ au Li Himalaya 1841. D co Bot. mag. 4005.

A pretty little alpine plant from the Himalayan Mountains. The flowers are of a pinkish lilac with a yellow eye, and the foliage and branches are densely clothed with long silky hairs. The plant appears to be quite hardy. (*Bot. Mag.*, March, 1843.)

P*lumbagíneæ.*

929. *S*TA'TICE 7514 monopétala var. denudàta *Bot Reg.* 1842, 59.

This is the plant sometimes called *S*tátice suffruticòsa, but Dr. Lindley informs us that it is only " a well-marked variety of *S*tátice monopétala." (*Bot. Reg.*, Oct. 1842.)

*Begon*iàceæ.

2654. BEGO'N*IA* [reg. 1842, 44.
crassicaùlis *Lindl.* thick-stemmed ⅋ ⊠ cu ½ f W Pk Guatemala 1841. C co Bot.

This plant has the singular property of producing its panicles of flowers without the leaves. In the month of February the flowers " appear in profusion upon rugged, fleshy, gouty stems, and the leaves are not formed till some weeks later." The species is not at all ornamental. (*Bot. Reg.*, Aug. 1842.)

[Bot. mag. 3990; and Paxt. mag. bot. vol. x. p. 73.
coccínea *Hook.* scarlet-*flowered* Ɛ. ☐ or 1 su. aut S Organ Mountains 1840. C r.m

This is decidedly the most splendid plant belonging to the genus, as its flowers are of a most brilliant scarlet, and arranged in a most graceful manner. The capsules are also of a bright red, shaded off between the angles almost to white. The plants continue a long time in flower, and will probably blossom throughout the greater part of the year. Considerable care is necessary in the culture, and particularly in striking the cuttings, to prevent the plants from damping off. (*Bot. Mag.*, Jan. 1843; and *Paxt. Mag. of Bot.*, May, 1843.)

[Bot. mag. 3968.
hydrocotylifòlia *Hook.* Penny-wort-leaved ⊈ ◬ or ⫰ su Pk ? South America 1840. C co

A very pretty species, with small leaves and small panicles of rather large flowers. It is very inferior in beauty to B. coccínea. It was received by Sir W. Hooker from the Berlin Garden, but its native country is not stated. (*Bot. Mag.*, Sept. 1842.)

Proteàceæ.

303. ISOPO'GON
scàber *Lindl.* rough-*leaved* ⚘ ⊔ cu 3 ap Pk Swan River 1842. C s.p Bot. mag. 4037.

This is a handsome species of the genus; the heads of flowers are large and of a deep pink, "exhibiting numerous styles and anthers in a circle as they expand, and these heads are nestled, as it were, among the green foliage." (*Bot. Mag.*, Sept. 1843.)

I. ròseus Lindl. This species appears very much like the last, as it has "rather a glaucous rigid foliage, deeply divided into three lobes, which are 3 or 5-cleft, and spiny-pointed." The flowers are reddish purple, in cones surrounded by the leaves at the end of the branches. (*Bot. Reg*, June, 1842, Misc.)

322. LOMA'TIA 2695 ilicifòlia *Bot. Mag.* 4023.

326. DRYA'NDRA 28824 arctotöides *Bot. Mag.* 4035.

E*læagnàceæ.*

341. ÆLÆA'GNUS
parvifòlia *Wall.* small-leaved ⚘ fra 10 jn W North of India 1842. S l Bot. reg. 1843, 51.

This is a very elegant species of the genus Ælæágnus. The flowers are whitish and very small, but they "are deliciously sweet." It appears quite hardy, and will grow in any good loamy soil; but it "is only increased by seeds or by suckers, which are sometimes produced when the plants become old." (*Bot. Reg.*, Oct. 1843.)

Asárinæ or A*ristolochiàceæ.*

2582. ARISTOLO'CHIA
gigas *Lindl.* giant ⫰ ▭ cu 6 jn.jl P Guatemala 1841. C s.p.l Bot. reg. 1842, 60.

This has the largest flowers of the species of Aristolòchia yet introduced. Its name, in its native country, is said to signify a Jew's ear; but it is much more like the ear of an elephant. It requires the usual culture of the stove species of the genus. (*Bot. Reg.*, Nov. 1842.)

C*ycadàceæ.*

Dion edùle Lindl. This is a very singular plant, which, when growing, has a simple stem like that of a Zàmia, but buried in wool. The leaves are about 2 ft. long, with about 60 pairs of sharp-pointed leaflets; and the fruit consists of rigid woolly scales; which "are heart-shaped at the base, and bear on each lobe a single nut about as large as a chestnut." (*Bot. Reg.*, Aug. 1843, Misc.)

O*rchidàceæ.*

2565. AE'RIDES [reg. 1842, 55.
crispum *Lindl.* crisp-*flowered* ⊈ ◬ or 1 my Pk W East Indies. 1840. D p.r.w Bot.
Synonyme: A. Brookii Paxt. Mag. Bot. vol. ix. p. 145.

This species is an exceedingly beautiful one, and of remarkably vigorous *habits.* It produces a long twisted stem with luxuriant leaves, and a raceme of *flowers* "from 1 ft. to 18 in. long, and bearing several side branches. The fragrance of the flowers is superior to that of A. odoràtum, and they last for an extraordinary length of time in a cool place, remaining perfect when detached, and kept out of water nearly a week." The plant should be grown on a block of wood, or in sphagnum moss. (*Bot. Reg*, Oct. 1842; and *Paxton's Mag. of Bot.*, Aug. 1842.)

A. virens Lindl. A native of Java, with large sweet-scented flowers, which are white, and spotted with green. (*Bot. Reg.*, May, 1843, Misc.)

Acianthèra punctàta Scheid. A small orchidaceous plant, a native of Brazil, resembling at first sight a Pleurothállis. (*Bot. Reg.*, Jan. 1843, Misc.)

Acinàta Lindl. A genus of orchideous plants nearly related to Peristèria. Two species are described, A. Humbóldtii and A. Bárkeri, which are the plants generally known as Peristèria Humbóldtii and P. Bárkeri. (*Bot. Reg.*, Oct. 1843, Misc.)

Acriópsis pícta Lindl. A pretty little plant, with the habit of Sarcánthus pállidus. The flowers are white and green, slightly stained with purple. It is a native of Bantam. (*Bot. Reg.*, Oct. 1843, Misc.)

Angræ'cum *vesicàtum* Lindl. From the Ashantee country. The flowers are white and inconspicuous. (*Bot. Reg.*, Jan. 1843, Misc.)

A. *ashanténse* Lindl. Another species from the same country, remarkable for its leaves, which appear as if they had been partly eaten away. The flowers are of a light cinnamon colour, and are produced in spikes about 4 in. long. (*Bot. Reg.*, July, 1843, Misc.)

A'nia bicórnis Lindl. A singular plant from Ceylon, the flowers of which "are green, except the lip, which is of a bright yellow." (*Bot. Reg.*, June, 1842, Misc.)

2504. **BARKE'R*IA*** [p. 169.
spectábilis *Bate.* showy £ ⊠ or 1 jn Li Guatemala 1841. D Paxt. mag. bot. vol. x.

A very showy plant, which may be grown either on a block of wood or in a wooden basket in moss. The temperature should never be above 65°, and air should be admitted freely. This plant is called *Flor de Isabel* in its native country. (*Bot. Reg.*, June, 1842, Misc.; and *Paxt. Mag. of Bot.*, Sept. 1843.)

B. Lindleyàna Bate. A very beautiful plant with rich deep purple flowers, which remain a great length of time without fading. The plant is a native of Costa Rica. (*Bot. Reg.*, Jan. 1842, Misc.)

Beatònia *atràta* Herb. A handsome plant with very dark flowers. (*Bot. Reg.*, Oct. 1843, Misc.)

Bifrenària inodòra Lindl. This plant, in habit and general appearance, approaches so near to Maxillària tetragòna, as to have been mistaken for it; but on flowering it proved to be widely different from that species. It is a native of Rio, whence it was introduced in 1839. (*Bot. Reg.*, June, 1843, Misc.)

Bolbophýllum adenopétalum Lindl. A native of Sincapore with yellowish flowers, which are slightly fragrant. (*Bot. Reg.*, Dec. 1842, Misc.)

B. calamàrium Lindl. A very singular plant with flowers of a dusky yellow mixed with purple, on a scape which is 2 ft. long, and quite erect. The lip of the corolla is movable, and fringed with long purple hairs. (*Bot. Reg.*, Oct. 1843, Misc.)

Brássia brachiàta Lindl. This plant, Dr. Lindley mentions, is the same as that called Brássia Wràyæ in the gardens; but in Curtis's *Botanical Magazine* there is a plant figured under the name of Brássia Wràyæ, t. 4003., which Sir W. Hooker says had been previously communicated to several collections under the name of Oncídium Wràyæ, though another plant had been previously described and figured under that name. (*Bot. Reg.*, Jan. 1843, Misc.; and *Bot. Mag.*, March, 1843. See also our Vol. for 1841, p. 168.)

BROMHEA'D*IA* Lindl. (In honour of *Sir E. F. Bromhead*, Bart., F.R.S.)
palústris *Lindl.* marsh £ ⊠ or 4 jn W. Pk Sumatra 1840. D p Bot. mag 4001.

A very handsome plant with tall graceful stems and delicate flowers. It is said to have been "dug out of a bog at Sumatra, a strange habitat for a plant of this kind, but which has given rise to the specific name." (*Bot. Mag.*, March, 1843.)

2530. CATASE'TUM [p.r.w Bot. mag. 4017.
viridi-flàvum *Hook.* greenish-yellow ℰ ⍍ cu 1 jn G.Y Central America 1842. D

A very curious species with large flowers, which are green on the outside and yellow within. (*Bot. Mag.*, May, 1843.)

[1843, 9.
plániceps *Lindl.* flat-headed ℰ ⍍ 1 jn G.Y Spanish Main 1840. D p.r.w Bot. reg.

A still more singular species than the last, the flowers of which look as if they were in a green livery turned up with yellow. (*Bot. Reg.*, Feb. 1843.)

[mag. 3942·
globiflòrum *Hook.* globe-flowered ℰ ⍍ or 1 jn Ol.Br G Brazil 1840. D p.r.w Bot·

A most remarkable plant for its curious ball-like flowers, which are of colours as remarkable as their form. (*Bot. Mag.*, May, 1842; and *Bot. Reg.*, June, 1843, Misc.)

C. nàso Lindl. This is a very singular plant, and the lip is prolonged into the form of a large nose. The flowers are without fragrance, and their colours are green, crimson, and very dark purple. (*Bot. Reg.*, Oct. 1843, Misc.)

2553. CATTLE'YA [p. 265.
supérba *Lindl.* superb ℰ ⍍ or 1 s C.P Guiana 1840. D p.r.w Paxt. mag. bot. vol. ix.

This is an exceedingly splendid species. It is so very fragrant that the odour in the morning is said to be "too powerful in a confined place. The splendid flowers remain uninjured three or four weeks." (*Paxt. Mag. of Bot.*, Jan. 1843.)

Calánthe Masùca *Lindl.* A terrestrial orchideous plant with deep violet-coloured flowers. A native of India. (*Bot. Reg.*, July, 1842, Misc.)

Centranthèra punctàta Scheid. This is very like a Pleurothállis; but it has glaucous leaves, marked with brown spots. It is a native of Brazil. (*Bot. Reg.*, Jan. 1843, Misc.)

Cleisóstoma dealbàtum Lindl. A plant of little beauty, with small bright yellow flowers. (*Ibid.*)

CLOWE'SIA Lindl. (In honour of the *Rev. Mr. Clowes*, of Broughton Hall, near Manchester.)
ròsea *Lindl.* rosy ℰ ⍍ cu ½ mr W.Pk Brazil 1842. D p.r.w Bot. reg. 1843, 39.

A very curious little plant, with the habit of growth of a Cattlèya, but with very different flowers. (*Bot. Reg.*, Aug. 1843.)

Cœlógyne testàcea Lindl. A native of Sincapore with flowers of a dingy clay-colour. (*Bot. Reg.*, June, 1842, Misc.)

Cólax Lindl. This is a new genus formed of three species of the genus Maxillària, viz. C. víridis, C. placanthèra, and C. jugòsus. (*Bot. Reg.*, June, 1843, Misc.)

2538. COMPARE'TTIA [bot. vol. x. p.l.
ròsea *Lindl.* rose-coloured ℰ ⍍ or ½ su Ro Spanish Main 1840. D p.r.w Paxt. mag.

This plant has been already mentioned in our Vol. for 1840, p. 595. It is remarkable for the deep colour of its flowers, which are extremely beautiful. It is difficult to cultivate on account of the scantiness of its roots; as, unless it is very securely fastened to the log which supports it, it is liable to fall off and be broken. This species is always grown on logs of wood, on account of the defectiveness of its roots, which would soon become decayed in a pot. (*Paxt. Mag. of Bot.*, Feb. 1843.)

3524. CIRRHOPE'TALUM
chinénse *Lindl.* Chinese ℰ ⍍ or ½ jn Y.R China 1840. D p.r.w Bot. reg. 1843, 49.

Nothing can be imagined more singular than these flowers, or rather than the umbel which is formed by them. Each flower represents a kind of face like that given to Mother Shipton, and each has a long beard hanging to it. The lower part of the flower and the beard are in continual motion, and a most curious effect is produced by a circle of these flowers, which appear to be constantly wagging their chins. (*Bot. Reg.*, Oct. 1843.)

2523. CYMBI'DIUM [Paxt. mag. bot. vol. x. p. 97.
devoniànum *Paxt.* *Duke of* Devonshire £ ⍍ or 1 mr.ap Y.P India 1837. D p.r.w

This is a species of great beauty, but it does not possess the same advantage that some of the others do, of preserving its flowers uninjured for several weeks after they are cut; as in a little time they change their colour and rapidly decay. (*Paxt. Mag. of Bot.*, June, 1843.)

C. chloránthum Lindl. A Nepal species with greenish flowers, having the lip spotted with yellow and crimson. After flowering the blossoms become of a dusky wine colour. (*Bot. Reg.*, Oct. 1843, Misc.)

3537. CYCNO'CHES [1843, 22.
pentadáctylon *Lindl.* five-fingered £ ⍍ cu 1 mr Br.G Brazil 1841. D p.r.w Bot. reg.

A very singular plant with large greenish-coloured flowers, covered with broad chocolate-brown blotches. The lip has five finger-like lobes, and hence the name. (*Bot. Reg.*, April, 1843.)

2547. DENDRO'BIUM
àqueum *Lindl.* watery £ ⍍ pr 1 n W India 1841. D p.r.w Bot. reg. 1843, 54.

It is a plant of no great beauty, and it is cultivated in the same manner as the other species of the genus. (*Bot. Reg.*, Oct. 1843.)

D. adúncum Wall. The flowers are almost transparent, of a bright pink, and nearly as large as those of D. moschàtum. (*Bot. Reg.*, Aug. 1842, Misc.)

D. compréssum Lindl. This is a species with curiously compressed stems not more than 3 or 4 inches long. It is a native of Ceylon, and has yellow flowers. (*Bot. Reg.*, Sept. 1842, Misc.)

[Bot. reg. 1843, 37.
cucumérinum *MacLeay.* Cucumber £ ⍍ cu ¼ jn W.Pk New Holland 1842. D p.r.w

This is a very singular plant, as it looks, when not in flower, like a heap of little cucumbers. It has no beauty, but only its singularity to recommend it. (*Bot. Reg.*, July, 1843.)

D. júnceum Lindl. This species has rather large green flowers streaked with faint purple lines. It is a native of Sincapore. (*Bot. Reg.*, Feb. 1842, Misc.)

[3970.
macránthum *Lindl.* large-flowered £ ⍍ or 2 ap Li Manilla 1841. D p.r.w Bot. mag.

This very splendid plant is remarkable for the large size of its flowers, which frequently measure 5 in. across. (*Bot. Mag.*, Oct. 1842.)

D. planibúlbe Lindl. This plant is remarkable for the flatness of its pseudobulb. The flowers are white and veined with purple. (*Bot. Reg.*, July, 1843, Misc.)

[1843, 17.
rhómbeum *Lindl.* rhomb-*lipped* £ ⍍ or 1 au Pa.Y Manilla 1840. D p.r.w Bot. reg.

A very pretty species, a native of Manilla. (*Bot. Reg.*, March, 1843.)

D. Rúckeri Lindl. A native of Manilla, with nankeen-coloured, sweet-scented flowers. (*Bot. Reg.*, April, 1843, Misc.)

[Bot. reg. 1843, 6.
sanguinoléntum *Lindl.* blood-stained £ ⍍ or ¼ [au Y.V.S Ceylon 1842. D p.r.w

This is a very singular plant from its mixing in its flowers the three primitive colours of yellow, red, and blue (the latter being, however, in the form of violet), as it was supposed by DeCandolle and other botanists that these three colours were never found together even in the same genus. The species is a native of Ceylon, with pendulous stems of a delicate purple tinge. (*Bot. Reg.*, Jan. 1843.)

D. scòpa Lindl. A singular species, of no beauty, from Manilla. (*Bot. Reg.*, Aug. 1842, Misc.)

[reg. 1843, 28.
taurinum *Lindl.* bull-*headed* £ ⍍ or 5 o Rsh.P W Manilla 1841. D p.r.w Bot.

This is a most remarkable species, the flowers of which certainly look like a number of bulls' heads, with long twisted petals for horns, and the central sepal rolled up and resembling the hair on the bull's forehead. It is an exceedingly vigorous-growing plant and is well deserving of cultivation. (*Bot. Reg.*, June, 1843.)

Dendrochìlum latifòlium Lindl. See our Volume for 1840, p. 551. This plant has long spikes of green flowers, and it was imported from Manilla by Messrs. Loddiges. (*Bot. Reg.*, July, 1843, Misc.)

2554. EPIDE'NDRUM [1842, 50.
lancifòlium *Lindl.* **lance-leaved ℰ ⍍ or 1 au P.Y Mexico 1840. D p.r.w Bot. reg.**

This is a very handsome species of the genus, and belongs to the division which contains the fragrant kinds. It should be kept in a cool stove, and never allowed to become perfectly dry. (*Bot. Reg.*, Sept. 1842.)

E. polyánthum Lindl. The flowers are of a rich salmon colour and very abundant. The plant is from Guatemala. (*Bot. Reg.*, Jan. 1842, Misc.)

E. latìlabre Lindl. A plant of little beauty, found in several parts of South America. (*Bot. Reg.*, Sept. 1842, Misc.)

E. aurìtum Lindl. A little plant with pale-green flowers, more curious than beautiful. (*Bot. Reg.*, Jan. 1843, Misc.)

E. rubrocínctum Lindl. The flowers are sweet-scented, and of a dull yellowish green, bordered with purple. (*Bot. Reg.*, Feb. 1843, Misc.)

E. cubénse Lindl. " A Cuba plant, rare, delicate, and beautiful." (*Bot. Reg.*, March, 1843, Misc.)

E. arbúscula Lindl. This plant has a large branching stem and leathery leaves 3 or 4 inches long; but its flowers are quite destitute of brilliant colours. (*Bot. Reg.*, May, 1843, Misc.)

E. lamellàtum West. The stem is about 1 ft. high, and the flowers are of a delicate pink. It is a native of Honduras. (*Bot. Reg.*, June, 1843, Misc.)

E. óvulum Lindl. A curious little plant, the flowers of which are olive-green, white, and crimson. (*Bot. Reg.*, July, 1843, Misc.)

E. collàre Lindl. " The stems are 18 in. long, strong, and deeply furrowed. The flowers are white, changing into yellow and brown" as they fade. (*Bot. Reg.*, Aug. 1843, Misc.)

E. diòtum Lindl. From Guatemala. The raceme is about 2 ft. high, and the leaves about 1 ft. long. The flowers are of a dull cinnamon colour. (*Bot. Reg.*, Sept. 1843, Misc.)

E. limbàtum Lindl. A Guatemala plant with the habit of E. glaúca, but much larger. The flowers are of a dull purplish brown, with a pale yellow border round the margin. (*Bot. Reg.*, Oct. 1843, Misc.)

Earìna suaveòlens Lindl. This is a very rare plant, a native of New Zealand. " The stems are terminated by dense, oblong spikes of white flowers," with yellow spots, and these flowers are delightfully fragrant. (*Bot. Reg.*, Sept. 1843, Misc.)

E'ria profùsa Lindl. A species from Ceylon of little beauty. (*Bot. Reg.*, Jan. 1842, Misc.)

E. mucronàta Lindl. A native of Sincapore, with white flowers having a faint tinge of pink and a delicious fragrance, like that of violets. (*Bot. Reg.*, April, 1842, Misc.)

E. acutifòlia Lindl. A small Indian species of no beauty. (*Bot. Reg.*, June, 1842, Misc.)

E. floribúnda Lindl. A handsome plant with a tall stem and numerous large leaves. The flowers are small and pink. It is a native of Sincapore. (*Bot. Reg.*, May, 1843, Misc.)

E. multiflòra Lindl. This is a native of Java, and it has small white flowers, the column of which is of a deep violet. (*Bot. Reg.*, July, 1843, Misc.)

Gongòra truncàta Lindl. A Mexican species with straw-coloured flowers of a very peculiar scent. (*Bot. Reg.*, May, 1843, Misc.)

Govènia fasciàta Lindl. One of the prettiest species of the genus, a native of Mexico. (*Bot. Reg.*, Oct. 1843, Misc.)

Hexadèsmia fasciculàta Brong. This is a plant with small green flowers, belonging to a new genus of Mexican Orchidàceæ nearly allied to Dendròbium, and which is supposed to be the same as Mr. Bateman's genus Hexòpia. (*Bot. Reg.*, June, 1842, and Feb. 1843, Misc.)

Hartwègia purpùrea var. *angustifòlia* Lindl. This is a very distinct variety. (*Bot. Reg.*, June, 1843, Misc.)

3582. **LÆ'LIA**
flàva *Lindl.* yellow £ ☒ or 1 su Y Brazil 1840. D p.r.w Bot. reg. 1842, 62.

This is a very pretty plant with bright yellow flowers. It should be grown in a cool stove or a warm greenhouse, in which " it should be tied to a block of wood, or placed in a basket and hung from the rafters." (*Bot. Reg.*, Nov. 1842.)

L. pedunculàris Lindl. A Mexican species of great beauty with rich violet-coloured flowers. (*Bot. Reg.*, Feb. 1842, Misc.)

LYCA'STE Lindl. (A beautiful woman of Sicily.)
plàna *Lindl.* *flat-flowered* £ ☒ cu 1 o C.W Boliver 1842. D p.r.w Bot. reg. 1843, 35.

A large strong-growing plant, which requires a great heat to flower it to perfection. (*Bot. Reg.*, July, 1843.)

L. tetragòna Lindl. This is the plant which was formerly called Maxillària tetragòna. (*Bot. Reg.*, June, 1843.)

Lìparis alàta Lindl. The handsomest species of this genus, a native of Mexico. (*Bot. Reg.*, Jan. 1843, Misc.)

Lissochìlus ròseus Lindl. This is a terrestrial orchideous plant, known in some collections as Dendròbium ròseum. (*Bot. Reg.*, April, 1843, Misc.)

Leochìlus oncidiöìdes Knowles et West. This is the plant that is known in some collections as Rodriguèzia maculàta, and in others as Oncídium macranthèrum. (*Bot. Reg.*, March, 1842, Misc.)

Lacæ'na bícolor Lindl. This belongs to a new genus nearly allied to Peristèria. L. bìcolor has yellow flowers spotted with purple. (*Bot. Reg.*, Oct. 1843, Misc.)

2537. **MAXILLA'RIA** [mag. 3966.
acutipétala *Hook.* sharp-petaled £ ☒ or ½ mr.ap Y.P Br Central America 1842. Bot.

This is a very handsome species, very near M. pícta. (*Bot. Mag.*, Sept. 1842; and *Bot. Reg.*, March, 1843, Misc.)

M. galeàta Scheid. A Brazilian species without fragrance, and with dingy purple flowers. (*Bot. Reg.*, Jan. 1843, Misc.)

M. bractéscens Lindl. This species has large flowers of " a dull yellow with a reddish brown lip," and long narrow bracts. The scape is 1½ ft. high, and bears five or six flowers. (*Bot. Reg.*, Dec. 1842, Misc.)

M. Skínneri Bate. This is a different species from the one described in the *Bot. Reg.* Misc. for 1840. The present species has magnificent flowers, which " actually measure upwards of 6 in. across. The colours of these flowers are peculiarly delicate," being of pure white and brilliant crimson. (*Bot. Reg.*, Feb. 1842, Misc.)

3601. **MORMO'DES** [43.
lineàtum *Bate.* streaked £ ☒ cu 1 su Y.P Guatemala 1840. D p.r.w Bot. reg. 1842.

This very curious species is a native of Guatemala. One of the most striking features in its flowers is an appearance of distortion, which makes them " look as if they had had their joints broken, and then unskilfully set again." All the species of this genus require a low temperature. (*Bot. Reg.* Aug. 1842.)

luxàtum *Lindl.* dislocated £ ☒ cu 1 jn Y Mexico 1842. D p.r.w Bot. reg. 1843, 33.

This plant has the same peculiarity in its flowers as the last, but their dis-

3598. MILTO'NIA [mag. bot. vol. ix. p. 241.
Clowèsia Paxt. *Rev. J.* Clowes' s ⚘ ⊠ or 1 o.d Y.Ll.R Brazil 1840. D p.r.w Paxt.

A very handsome plant, very nearly allied to M. cándida, of which it may probably prove to be only a variety. (*Paxt. Mag. of Bot.*, Dec. 1842.)

M cándida var. *grandiflòra* Lindl. The flowers are twice as large as those of the species. The flowers are of a most brilliant white and deep rich brown; spotted towards the extremities with yellow. (*Bot. Reg.*, Oct. 1843, Misc.)

Masdevállia floribúnda Lindl. A little Mexican plant, with brownish yellow flowers. "It is the only species of this genus not found in the northern hemisphere." (*Bot. Reg.*, Oct. 1843, Misc.)

Notýlia pubéscens Lindl. "A Brazilian species, with dull orange-coloured, rather sweet-scented, flowers." (*Bot. Reg.*, Sept. 1842, Misc.)

2540. ONCI'DIUM [1843, 12.
bicallòsum *Lindl.* two-warted ⚘ ⊠ or 1 su Y Guatemala 1842. D p.r.w Bot. reg.

A very singular species with large flowers, which appear in a "dwarf erect raceme," and the labellum of which has two distinct tubercles on its crest. (*Bot. Reg.*, March, 1843.)

urophýllum *Lodd.* tail-leaved ⚘ ⊠ pr 4 mr Y Brazil 1841. D p.r.w Bot. reg. 1842, 51.

This plant is remarkable for its leaves, which "are shaped like a penknife curved backwards, so as to have the edge on the convex side. This is caused by the two sides of the leaf being brought into contact, and then growing together, the back of the knife-shaped leaf consisting of their edges." (*Bot. Reg.*, Sept. 1842.)

[1843, 23.
microchìlum *Bate.* small-lipped ⚘ ⊠ cu 4 jn Va Guatemala 1838. D p.r.w Bot. reg.

This is one of the most remarkable species of the genus, as, from the smallness of the lip, the flowers are of quite a different shape from those of the oncidiums generally. (*Bot. Reg.*, May, 1843.)

O. pergamèneum Lindl. This is a pretty species from Guatemala, which was introduced in 1839. (*Bot. Reg.*, Jan. 1842, Misc.)

O. Súttoni Bate. A very distinct species with pretty flowers. (*Ibid.*)

O. ensàtum Lindl. "A Guatemala plant with singular sword-shaped leaves, and a panicle of flowers like that of O. altíssimum." (*Bot. Reg.*, March 1842, Misc.)

O. nànum Lindl. This singular plant has the habit of O. pùmilum, to which it is nearly allied. (*Bot. Reg.*, June, 1842, Misc.)

O. barbàtum Lindl. This species, which had been long lost, has been sent to the Glasgow Garden from Pernambuco. (*Bot. Reg.*, Sept. 1842, Misc.)

O. Forkèlii Scheid. A Mexican species, that is said to be one of the handsomest of the genus. (*Bot. Reg.*, Jan. 1843, Misc.)

O. cuneàtum Scheid. A small Brazilian plant, with white flowers spotted with crimson. (*Ibid.*)

O. cándidum Lindl. The flowers are quite white, with the exception of two small violet dots at the base of each petal, and the usual prominence at the base of the column, which is bright yellow. (*Bot. Reg.*, July, 1843, Misc.)

O. suàve Lindl. A Mexican species with chocolate-coloured flowers, which are tipped with yellow. It has a faint, but agreeable, odour. It was introduced in the year 1835. (*Bot. Reg.*, Feb. 1843, Misc.)

O. sphegíferum Lindl. A Brazilian species, between O. divaricàtum and O. pulvinàtum. (*Bot. Reg.*, March, 1843, Misc.)

[reg. 1843, 43.
uniflòrum *Booth.* one-flowered ⚘ ⊠ pr ¼ n Y Organ Mountains 1841. D p.r.w Bot.

A curious little plant allied to O. barbàtum. It has yellow flowers, and a very neat and compact habit of growth. (*Bot. Reg.*, Aug. 1843.)

3728. ODONTOGLO'SSUM [reg. 1843, 3.
citrósmum *Lindl.* lemon-scented ⚘ ⊠ or 1 my W.Li Mexico 1841. D p.r.w Bot.

O. Róssii (see our Vol. for 1839, p. 560.). A pretty variety of this plant has flowered with Mr. Barker. (*Bot. Reg.*, Feb. 1843, Misc.)

O. constrictum Lindl. The flowers are yellow, spotted with brown, except the lip, which is white stained with violet. (*Bot. Reg.*, March, 1843, Misc.)

Oberònia miniàta Lindl. The flowers are red, very small, very brittle, and loosely arranged in a nodding spike, sometimes as much as 8 in. long. (*Bot. Reg.*, Jan. 1843, Misc.)

Octomèria grandiflòra Lindl. This is the largest Octomèria yet seen. The leaf is about 8 in. long, and the stem about the same length. (*Bot. Reg.*, Sept. 1842, Misc.)

3478. PERISTE'RIA [reg. 1843, 18.
Humbóldti Lindl. *Baron* Humboldt's £ ⊠ or 2 mr R Venezuela 1841. D p.r.w Bot.

This plant is the same as the Angulòa supérba of Humboldt, and it has a splendid appearance, as its flowers, which are large and showy, are produced on a pendulous raceme 2 ft. long. It is found in temperate situations in Peru, and in some cases at an elevation of 6000 or 7000 feet above the level of the sea. (*Bot. Reg.*, April, 1843.) This is one of the species included by Dr. Lindley in his new genus of Acinàta, see p. 624.

Pleurothállis fœ'tens Lindl. This plant has no beauty, and it has an unpleasant odour. It is a native of Brazil. (*Bot. Reg.*, Jan. 1843, Misc.)

P. pedunculàris Lindl. A native of Rio Janeiro; the flowers of a pale straw colour. (*Bot. Reg.*, June, 1843, Misc.)

P. Smithiàna Lindl. Only interesting to the botanist. (*Bot. Reg.*, Aug. 1843, Misc.)

Polystàchya clavàta Lindl. An inconspicuous species, with small pale yellow flowers. (*Bot. Reg.*, Aug. 1842, Misc.)

Ponèra striàta Lindl. A curious species of this very singular genus. (*Bot. Reg.*, March, 1842, Misc.)

2566. RENANTHE'RA
matùtina *Lindl.* morning £ ⊠ pr 1 s Br.S Manilla 1842. D p.r.w Bot. reg. 1843, 41.

This is a pretty little plant, with a great profusion of cinnamon-coloured and scarlet flowers collected in a stiff panicle. The flowers are very small, but they make amends by their prettiness and their abundance for their want of size. (*Bot. Reg.*, Aug. 1843.)

Rodriguèzia cárnea Lindl. A plant of no particular beauty, a native of Columbia. (*Bot. Reg.*, Oct. 1843, Misc.)

3412. STANHO'PEA [orchidaceæ t. 27.
Martiàna Bate. Von Martius's £ ⊠ or 1 su Str.P Mexico 1827. D p.r.w Bateman's
var. bicolor *Bot. Reg.* 1843, 44.

"The present variety is a lovely plant with large pure white flowers richly but sparingly spotted with crimson." It is very sweet-scented, and altogether a magnificent plant. It is said to be a natural variety received from Mexico. (*Bot. Reg.*, Sept. 1843.)

2572. STE'LIS [3975.
atropurpùrea *Hook.* dark-purple £ ⊠ pr ½ f D.P Mexico 1838. D p.r.w Bot. mag.

A pretty little plant with dark purple flowers. (*Bot. Mag.*, Oct. 1842; and *Bot. Reg.*, Dec. 1842, Misc.)

S. *crassifòlia* Lindl. A singular little plant, with half-cylindrical leaves, imported from the West Indies in 1841. (*Bot. Reg.*, Feb. 1842, Misc.)

S. *argentàta* Lindl. The flowers are in long racemes, and are of a dull greenish purple, having "their truncated extremities covered with an appearance of minute particles of silver." (*Bot. Reg.*, Sept. 1842, Misc.)

Spiránthes cèrina Lindl. One of the terrestrial Orchidàceæ, a native of Guatemala: and which "belongs to that section of the genus Spiránthes of which the old Neóttia speciòsa is the type, and which has been called by Presl Sarcoglóttis, among all which it is at once known by its flowering without leaves, and its dull olive-brown aspect."

S. rosulàta Lindl. This species is from the same country. "It has a scape about 9 in. high, and a close spike of green flowers. The leaves are most beautifully coated on the under side with vesicular cells, which give them a peculiar frosted appearance." (*Bot. Reg.*, Aug. 1843, Misc.)

Saccolàbium ochràceum Lindl. A native of Ceylon, with small dingy yellow flowers. (*Bot. Reg.*, Jan. 1842, Misc.)

Scelochìlus Ottònis Klot. This is a small epiphyte, found by Mr. Edward Otto in the Caraccas, 5600 ft. above the level of the sea. It has small yellow flowers. (*Bot. Reg.*, April, 1842, Misc.)

Sobràlia macrántha Lindl. This is a terrestrial species, with very large dark crimson flowers. (*Bot. Reg.*, Aug. 1842, Misc.)

Stenocóryne longicórnis Lindl. This is a new genus, formed on the old Bifrenària longicórnis. (*Bot. Reg*, July, 1843, Misc.)

Sarcánthus filifórmis Lindl. An Indian species of no beauty. (*Bot. Reg.*, Sept. 1842, Misc.)

Trichocéntrum recúrvum Lindl. A Guayana plant, resembling T. fúscum in habit, but smaller. (*Bot. Reg.*, Feb. 1843, Misc.)

T. cándidum Lindl. A little plant, with white flowers slightly tinged with yellow, which are without a spur. (*Ibid.*)

2564. *VA'NDA* 48.
cristàta *Lindl.* crested ⚘ ⧄ cu 1 ap G.P.Y Nepal 1840. D p.r.w Bot. eg. 1842,

This is a very curious species, the flowers of which, though not showy, are very beautiful when closely examined. It was found growing on trees in Nepal, in 1818, by Dr. Wallich; but it seems only lately to have been introduced into this country. (*Bot. Reg.*, Aug. 1842.)

Vanílla P*almàrum* Lindl. One of the few orchidaceous plants which grow on palm trees. (*Bot. Reg.*, Sept. 1842, Misc.)

Scitamíneæ.

3452. GASTROCHI'LUS [4010.
longiflòra *Wall.* long-flowered ⚘ ⧄ cu 2 jl.au Pk.Y Rangoon 1840. D s.p Bot. mag.

This plant has no beauty to recommend it, though it is remarkable for the curious formation of its flowers. (*Bot. Mag.*, April 1843.)

I*ridàceæ.*

Beatònia purpùrea Herb. This is the plant formerly known as Tigrídia violàcea, which has been formed into a new genus by the Dean of Manchester, principally on account of some differences in the anthers and the style. The new genus is named in honour of Mr. Beaton, so well known from his writings in this Magazine and other publications. (*Bot. Reg.*, Sept. 1842, Misc.)

Herbértia Drummondiàna Herb. This is a new species of this very handsome genus, lately received from Texas. (*Ibid.*)

G*ladìolus crispiflòrus* Herb., and G. *caucásicus* Herb. These are two new species of Gladìolus, of which only the Latin characters are given in the *Botanical Register*. (*Ibid.*)

G. *æquinoctiàlis* Herb. This is a native of Sierra Leone, and interesting from its being the only species of the genus yet found within the tropics. (*Bot. Reg.*, Dec. 1842, Misc.)

G. *oppositiflòrus* Herb. This is a native of Madagascar, and it is frequently confounded with *G.* floribúndus in the nurseries. (*Ibid.*)

G. *spléndens* Herb. This is the Anisánthus spléndens of Sweet's *British Flower-Garden*, and it is the female parent of the hybrid Anisánthus mentioned below. (*Bot. Reg.*, June, 1843, Misc.)

139. ANISA'NTHUS 1200 spléndens var. hýbridus *Bot. Reg.* 1842. 58

that he has also raised hybrids between *G*ladìolus and Amarýllis. It will be seen above that the Dean of Manchester considers Anisánthus spléndens to be a *G*ladìolus ; but even then it is very remarkable that one of the parents of Mr. Plant's hybrid should be itself a mule. (*Bot. Reg.*, Sept. 1842.)

Trichonèma edùle Herb. A native of Socotra, where it was found in the small hollows of the primitive limestone rocks, about two miles from the coast. " The natives feed upon the corms." (*Bot. Reg.*, Dec. 1842, Misc.)

Hæmodoràceæ.

Barbacènia squamàta Herb. This is a neat little plant, introduced by Mr. Veitch of Exeter, which he supposed to be a Vellòz*ia*. The Hon. and Rev. W. Herbert, dean of Manchester, however, thinks it a very distinct section of Barbacèn*ia*, or a new genus ; and, in case the latter should be established, he proposes to call it Veitch*ia*, in honour of Mr. Veitch. (*Bot. Reg.*, Sept. 1843, Misc.)

*Amaryll*idàceæ.

979. **ALSTRŒME'R*IA***
nemoròsa *Gard.* wood ✻ ⌋ or 2 n ↘R.Y Organ Mountains 1840. O l.p Bot. mag. 3958.

A very handsome species of the genus, which was found by Mr. Veitch's collector on the Organ Mountains of Brazil, at an elevation of about 3000 ft. (*Bot. Mag.*, Aug. 1842.)

A. magnífica Herb. This is very slightly different from A. *Lígtu*. (*Bot. Reg.*, Sept. 1843, Misc.)

A. chorilllénsis Herb. This is another species described by the learned Dean of Manchester; an inhabitant of the Chorillos Mountains, Lima. (*Ibid.*)

3333. **COBU'RGH*IA*** [1842, 46.
hùmilis *Herb.* humble ♉ ⌊Δ⌋ or ¼ mr.ap S Peruvian Andes 1841. O r.m Bot. reg.

This was the species formerly noticed as Clitánthes hùmilis. (*Bot. Reg.*, Aug. 1842.)

[1842, 66.
versìcolor *Herb.* changeable ♉ ⌊Δ⌋ or 2 d.ja S.G.Taw. Andes 1841. O r.m Bot. reg.

A very showy species of the genus. A tall thick-stemmed plant, with large flowers, which vary in their colour from tawny to scarlet. It is very difficult to throw this species into flower. (*Bot. Reg.*, Dec. 1842.)

Bomàrea. Six species and one variety of this genus are described by the Hon. and Rev. W. Herbert. (*Bot. Reg.*, Sept. 1842, Misc.)

3655. **STENOME'SSON**
vitellìnum *Lindl.* yolk of egg ♉ [Δ] or 1 f Y Lima 1841. O co Bot. reg. 1843, 2.

A very handsome species of the genus ; but one which " is, at present, extremely rare." (*Bot. Reg.*, Jan. 1843.)

S. aurantìacum Herb., and *S. eustephioìdes* Herb. These two bulbs are only known by short Latin descriptions from the Dean of Manchester. (*Bot. Reg.*, Sept. 1843, Misc.)

969. **AMARY'LLIS** [s.l Bot. reg. 1842, 11.
Banks*iàna* Lindl. *Sir Joseph* Banks's ♉ ⌊Δ⌋ or 2 au.s Pk Cape of Good Hope 1840. O

This very handsome plant was at first supposed to be a variety of A. grandiflòra, which was named after Sir Joseph Banks, about twenty years ago. However, on submitting a specimen to Mr. Herbert, he seems to think that the present species is distinct; as, he says, it has the bulb and foliage of A. grandiflòra, with flowers more like A. mìnor and A. striàta. (*Bot. Reg.*, Feb. 1842, and March, 1842, Misc.)

Hippeástrum organénse var. *compréssum* Herb. This is nearly allied to *H.* psittacìnum ; and they will probably prove to be varieties of the same species. (*Bot. Reg.*, June, 1842, Misc.)

975. *Habránthus praténsis* (see our Vol. for 1842, p. 420.) var. *quadriflòra* Herb. This variety only differs from the species in having four flowers instead of three. (*Bot. Mag.*, Aug. 1842.)

Hymenocállis Skinneriàna Herb. This plant is a native of Guatemala, where it was discovered by Mr. Skinner. (*Bot. Reg.*, June, 1843, Misc.)

Callipsyche eucrosioìdes Herb. These bulbs were brought from the west coast of Mexico. They flowered without leaves in the month of March. When in leaf they so closely resemble the preceding plant as scarcely to be distinguished from it. (*Bot. Reg.*, July, 1842, Misc.)

Crinum brachynèma Herb. This is a species from Bombay. The umbel contains seventeen flowers, which are fragrant. (*Bot. Reg.*, May, 1842, Misc.)

933. NARCI'SSUS Hybrids. *Bot. Reg.* 1843, 38.

The plate alluded to contains six hybrid narcissi, which have been raised by Mr. Herbert, between the genera of the late Mr. Haworth. By these experiments it appears evident that the supposed genera were only varieties, or, at most, species of the genus *Narcíssus.* (*Bot. Reg.*, Aug. 1843, Misc.)

Hemerocallídeæ.

1005. AGAPA'NTHUS 8208 umbellàtus var. máximus *Bot. Reg.* 1843, 7.

The flowers are larger, the leaves broader, and the flower-scape very much longer than in the common kind. (*Bot. Reg.*, Feb. 1843.)

Blandfórdia marginàta Herb. "This handsome Australian plant was introduced by Mr. Osborn of the Fulham Nursery." It is distinguished from B. grandiflòra "by the less erect leaves, with a rufous serrate margin, and the coppery hue of its very showy flowers." (*Bot. Reg.*, Nov. 1842.)

Asphodèleæ.

105[illegible]. SCI'LLA 8812 peruviàna var. discolor *Bot. Reg.* 1843, 48.

This variety is so very distinct, that at first sight it seems to be a different species. Dr. Lindley, however, shows us that, after a careful examination, he cannot "discover any other distinction between them than that of the colour of the flowers, which in this plant are of a dingy pale fawn colour." (*Bot. Reg.*, Sept. 1843.)

1016. LI'LIUM testaceum *Lindl.* testaceous ♉ △| or 3 jn Y Japan 1841. O p.l Bot. reg. 1843, 11.

This plant, though very inferior to the other species which are natives of Japan, is yet a handsome half-hardy bulb. When potted, "the bulbs should be placed rather deep, because they make fibres above the bulb, as well as below it;" and they should never be repotted except in a dormant state. (*Bot. Reg.*, Feb. 1843.)

Bromeliàceæ.

956. TILLA'NDSIA rùbida *Lindl.* madder-coloured £ ⊐ or ½ f Pk Brazil 1841. O s.l Bot. reg. 1842, 63.

This is a very handsome species of the curious genus Tillándsia, which is very ornamental. (*Bot. Reg.*, Nov. 1842.)

28155. psittacìna *Synonyme*: Vrièsia psittacina *Lindl.* Bot. Reg. 1843, 10.

This is a new genus, formed by Dr. Lindley, in honour of Dr. de Vriese, Professor of Botany at Amsterdam. (*Bot. Reg.*, Feb. 1843.)

3492. ÆCHME'A fúlgens *Paxt.* brilliant ⊠ or 1 mr.ap S Cayenne 1842. Sk. s.p.l Paxt. mag. bot. [vol. x. p. 173.

This very showy plant is generally treated like one of the Orchidàceæ, and grown in a basket; but it is sometimes planted in a pot, and plunged in a bark-pit like a pine-apple. (*Paxt. Mag. of Bot.*, Sept. 1843.)

Pitcaírnia undulàta Scheid. A native of Brazil, with scarlet flowers. (*Bot. Reg.*, May, 1843, Misc.)

P. micrántha Lindl. A very small species of the same genus imported from Rio in 1841. (*Ibid.*)

Pùya recurvàta Scheid. A Brazilian plant with a spike about a foot long, covered with white flowers. (*Ibid.*)

ART. XII. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 552.)

ON reading over our preceding article on this subject, we feel that we have gone rather too far in condemning young gardeners as self-conceited. We are sorry for this, because we do not wish to hurt the feelings of any person or class of persons whatever, much less the feelings of those to whom we owe so much. The truth is, the passage was written at Southampton while we were in a state of severe bodily suffering, and we had no opportunity of seeing a proof either of that article, or the article which follows it, otherwise we should certainly have softened down the sentence. However, it is much better for young gardeners if they should be blamed more than they deserve, rather than that they should be overpraised; and they may depend upon this, that there is a general impression among the employers of gardeners, and also architects, land stewards, &c., that the young gardeners who have not seen much of the world are apt to fancy themselves wiser than they are.

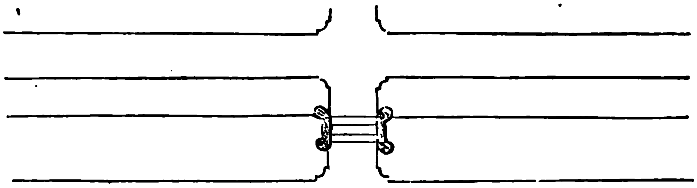
Mr. Ayres has said in an article that will be found in a subsequent page (p. 636.), that, before censuring gardeners, we ought to have censured landscape-gardeners, many of whom, he says, are equally as ignorant of the true principles of design as the working gardener. We fully acknowledge this, and we have frequently been astonished beyond measure at the plans which some of even the first nurserymen about London have sent out, and had executed, for their suburban customers. The truth is, the great majority of the employers of landscape-gardeners look out for the person whose terms are the lowest; and, as they do not know good from bad in this art, they are contented with what is done for them by a man who perhaps cannot give a reason for any one thing that he does. It is not very likely that a man who has been brought up to the nursery business can ever have the leisure and repose necessary to cultivate a knowledge of any of the arts of design and taste, unless he have a natural turn for these pursuits; and thence it frequently happens, that the plans of nursery landscape-gardeners will be found mere repetitions or imitations of what they have seen elsewhere.

For some years past, a change has been gradually taking place, as country gentlemen, in consequence of the general peace and their diminished incomes, have been obliged to reside more on their estates, and to direct more attention to improvements. Almost all the great families of the country, who are not sunk in an abyss of debt, are doing something, either in the way of building, landscape-gardening, or planting; and though there are but a small proportion of these who employ such architects as Barry, Blore, Salvin, or Lamb, and such a landscape-gardener as Nesfield, yet there are a few; and the result, to the thinking and observant part of landed proprietors, will show the inestimable value of good advice taken in time.

As a proof that knowledge in the employers of gardeners leads to a demand for those productions of which that knowledge has given them cognizance, we may refer to the fact of the horticultural societies throughout the country, and more especially those of London and Edinburgh. It will not be denied, that, in consequence of the superior fruits exhibited at these societies, their culture has been greatly improved throughout the whole country.

A good deal may be effected in the details of landscape-gardening by instructing practical gardeners in such matters as grouping circles of flowers or shrubs on lawns; cultivating flowers, where the gardenesque style is adopted, always in separate circles, or other forms of beds, from those which contain the shrubs; keeping the edgings of beds, borders, and walks, always in one uniform state; keeping the walks properly filled with gravel, and the beds and borders with soil; turfing up beds and borders of shrubs where digging is no longer of any use; not to mention a number of other points of management; and to effect this improvement is the great object of this series of articles.

A gardener may do all these things, and yet not be able to lay out an entire place containing a park and pleasure-ground, which no person without the eye of a landscape painter can have the slightest pretensions to do.



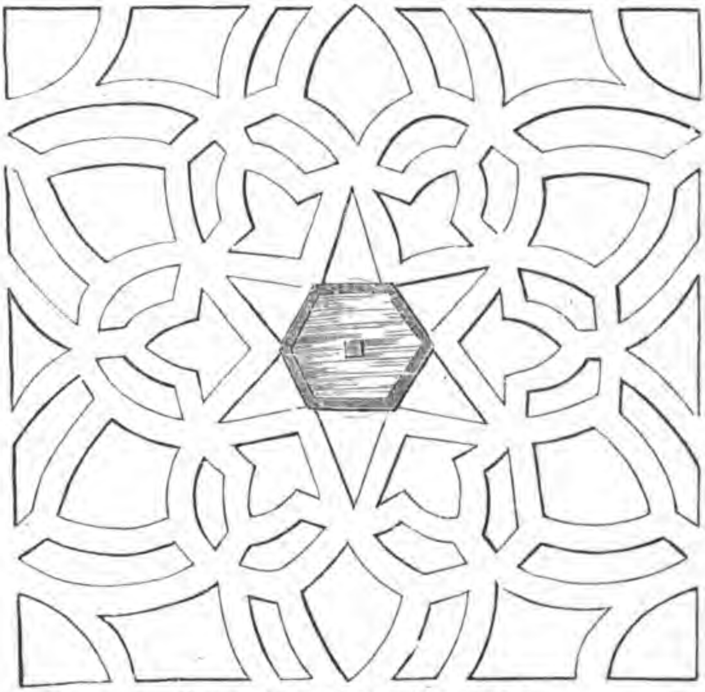


Fig. 125. *A Flower-Garden with angular Beds.*

Design *fig.* 125. consists of a symmetrical assemblage of angular beds, the sides of which are partly straight and partly curved. It will therefore be very easily laid out, by first drawing it to a scale three or four times larger than the figure, and then finding the centres to each curve. These centres are found by a very simple geometrical problem, viz., three points being given not in a straight line, to find the centre of a circle whose circumference shall pass through them.

Such a design as the present is better adapted for forming an episode, than a shrubbery walk; or for placing before an Elizabethan greenhouse, than for laying out in front of a modern villa that has no pretension to style. In a place where there is a shrubbery walk of some length, flower-gardens of different characters may be introduced one after another; but, on the lawn in front of the house, a flower-garden or the flower-beds ought to be strictly in accordance with the style of the elevation.

(*To be continued.*)

Art. XIII. *Remarks on one of the Designs in the Article "On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden."* By W. P. Ayres.

I have just been reading over your article "On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden," p. 547., and, though you have censured poor gardeners rather severely, I must confess that, as designers or even carriers out of plans for lawns or flower-gardens, we are by no means undeserving of censure. You might, however, in passing, as well have stated that many who profess and call themselves "landscape-gardeners" are equally ignorant of the true principles of design, as a walk through nine tenths of the gardens in the country, both public and private, will most fully testify; and I think you yourself could not name half a dozen professional landscape-gardeners in the United Kingdom whom you would undertake to pronounce men who really understood their profession as an art of design and taste. A gardener of reputed eminence, at present intrusted with the formation of an extensive garden, when interrogated by a non-professional friend of mine as to the principles of constructing plant and forcing-houses, replied, "Oh, it is merely a matter of taste:" and, while men in high places disseminate such notions, it is not to be wondered at, that landscape-gardening and garden architecture, as an art and a science, should make but very lethargic progress.

The greatest barrier to the progress of improvement in landscape-gardening is the want of taste among the aristocracy and gentry; and, until they are somewhat better informed as to the principles of the science, so as to be capable of understanding plans that are laid before them for their approval, it is nonsense to expect much in the way of improvement from gardeners. But so soon as they shall require original designs adapted to the local peculiarities of the situation they are intended to embellish, then will they have a race of gardeners capable of doing things properly. At present the rage is for imitation; and if a gentleman requires a new flower-garden, or to alter an old one, he does not think of having an original design, but takes a pattern from some celebrated garden, as, for instance, Dropmore, Chatsworth, Woburn, or some such place; or, what is worse, collects a number of fancy-formed beds from various places, and huddles them together, with about as much taste or system as an infant would display in forming a map of the world. Thus it is no uncommon thing to see a Swiss cottage with a geometrical flower-garden, and a terrace in the front; or a splendid Italian villa surrounded by an irregular garden of common trees, shrubs, and herbaceous plants. If I wished for an example of really bad taste, I would point to the flower-garden at Wimbledon, figured in the *Suburban Gardener*, p. 162. [see p. 650., in which we say, "in point of general design, this flower-garden has nothing to recommend it"]; indeed it is almost inconceivable how such an abortion could have been jumbled together. The flower-gardens in the Horticultural Gardens at Chiswick, though of a different character, are nearly as bad, and no man could group them so as to make them look well. In making these remarks it is not my wish to give offence; but it may be fearlessly stated that the gardens in question are at least half a century behind the spirit of the age.

Again, in the gardens at Hewell, noticed with considerable commendation and *éclat* in the *Gardener's Chronicle* for 1843, p. 663., a few weeks back, there are a splendid fountain and flower-garden at the bottom of an old stone quarry, and a grass garden in the front of the conservatory; two examples of perhaps as bad taste as could well be conceived. Had they placed the fountain and dressed flower-garden in front of the conservatory, and consigned the grasses to the company of the other British plants in the rock garden, I think they would have been much more appropriately arranged. The water-dipping willow at Chatsworth was always a monstrosity in my estimation, and would be a more fitting appendage to Vauxhall or a cockney tea-garden, than to the princely domain in which it is placed.* Look again at the gin-glass in tea-saucer fountain in the lake near Buckingham Palace, and at the cast-metal fountain in the Serpentine in Kensington Gardens. The erection and execution of these two abortions is a national disgrace. But, if one were disposed to find fault, it is not difficult to pick out subjects for censure; would it were otherwise!

Your arguments at page 551., relative to having the beds in flower-gardens of various sizes, are particularly clear; but it strikes me that in the two plans, figs. 118. and 119., you have rather exceeded your own principles, inasmuch as I think the large corner beds in fig. 118. are too large to group properly with the smaller beds; and the same may be said of the horseshoe-shaped beds in fig. 119. Were the largest beds in the plans a little smaller, and the next sizes a trifle larger, I think the whole would be more proportionate, and I am certain could be more effectively planted. By the same rule that you very properly insist upon the beds being of various sizes, I demand to have them planted with plants proportionate to their size; and, to effect, this the large beds must either be reduced in size, or the small ones become blanks in the garden.

In offering these remarks, I do not know whether I shall come under the lash you have directed against "the overweening self-conceit of young gardeners, especially Scotch ones;" but, if I do, it is yourself and the West London Gardeners' Association that are to blame for having taught me to become a caviller.

Brooklands, Blackheath Park, October 7. 1843.

ART. XIV. *Arboricultural Notices.*

THE following are selected from the *Hortus Collinsonianus*, just printed, and noticed in a subsequent page. "By various memoranda it appears that Mr. Collinson frequently employed Gordon the nurseryman to raise his seeds, particularly those from the warmer climates, and among his papers there is, in his own handwriting, the following tribute to his abilities. 'The skill and ingenuity of some men is surprising. On August 30. I was at James Gordon's, gardener, at the last house on the left hand at Mile End; there he showed me a pot of seedlings of the cactus, or great melon thistle, perhaps the first ever raised from seed: but what shows his great knowledge and experience in vegetation is his way of raising the finest dusty seeds; before him, I never knew or heard of any man that could raise the dusty seeds of the kalmias, rhododendrons, or azaleas. These charming hardy shrubs, that excel all others in his care, he furnishes to every curious garden; all the nurserymen and gardeners come to him for them; and this year, after more than twenty years' trial, he showed me the loblolly bay of Carolina coming up from seed in a way not to be expected; this elegant evergreen shrub is next in beauty to the magnolias: and his sagacity in raising all sorts of plants from cuttings, roots, and layers surpasses all others; by which our gardens are enriched with an infinite variety, and for many years I have not been a little assistant to him in procuring seeds and plants from all countries. This honourable mention of Mr. Gordon, who is now in his fifty-sixth year, is an act of gratitude due to his memory from his old friend—*Peter Collinson, in my sixty-eighth year. Mill Hill, Sept.* 2. 1763.' The loblolly bay is the Gordònia lasiánthus, and from the circumstance here mentioned, this splendid shrub may probably have been selected, at the suggestion of Mr. Collinson, to perpetuate Mr. Gordon's name." (*H. C.* p. 5.)

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* This water-dipping willow, as a relic of the gardens of a former age, we should be sorry to see removed.—*Cond.*

A'cer sacchárinum is described as having leaves silvery beneath, and a variety as platanifòlio. (*Hort. Coll.*, p. 2.) This last is probably *A. s.* nìgrum, noticed in our Volume for 1841, p. 397., as being in the Paris Garden, with the leaves not in the slightest degree velvety beneath, and uniting with difficulty when inarched. We hope some spirited nurseryman will procure plants.

Arúndo Dònax flowered in September, 1762, and does not die down every year, as Miller states. (*H. C.* p. 5.)

Castànea vésca. "*Mem.* 'Sept. 16. 1758. In Writtle Park, three miles on the left of Ingatstone, in Essex, belonging to Lord Petre, is a stately chestnut tree, which is now flourishing, that I measured, 5 ft. above the ground, and found its girth 45 ft.—*P. Collinson.*' My friend, Edward Forster, informs me that this noble tree has been gone many years; and that the tradition in the neighbourhood is, that fifteen deer could shelter under it. By another memorandum, it appears that the possessor of Mr. Collinson's copy of Martyn's *Hist. Plant.* will find two drawings of this splendid tree bound up with it; and he has added a short description of it to his history of the Tortsworth chestnut, in the *Gentleman's Magazine* for 1766." (*H. C.* p. 10.)

Ceanòthus americànus. A very pretty tea is made from the dried leaves, good for inveterate coughs, and shortness of breath. (*H. C.* p. 10.)

Cèdrus Libàni. "*Mem.* '1751. Our two large cedars of Lebanon, on each side the grass walk, were given me by the Duke of Richmond, and brought from Goodwood.' 'Six cedars of Lebanon, five years old, in the field, Ap. 30. 1761, given me by Mr. Clark, all grew,' and thus it is probable that the ages of the two noble trees, which remain at Mill Hill, may be nearly ascertained. See Loudon, *Arb. et Frut. Brit.* vol. i. p. 56. In the sixth edition of the *Gardener's Dictionary*, it is said that the cedars at the Chelsea Garden were planted in 1683, when about 3 ft. high; and to this Mr. Collinson has added the following remark: 'Mr. Miller concludes that these cedars, at 3 ft. high, were five years old, and they undoubtedly were the first in England.' It appears from Evelyn, that, in 1664, the cedar was unknown in England." (*H. C.* p. 10.)

Cérasus lusitánica. "*Mem.* 'The Portugal laurel, now the greatest ornament of our gardens, was, in the year 1719, first brought from Portugal to Mr. Fairchild, a famous gardener for rarities, at Hoxton, and was for some years kept in a greenhouse; it was exposed by degrees, and has since been found to endure all weathers.'" (*H. C.* p. 11.) The date of introduction in the catalogues is 1648, which would thus appear to be a mistake.

Comptònia asplenifòlia. The leaves make a fine tea, and, used as hops, give a good flavour to beer. (*H. C.* p. 14.)

Córnus flórida. See *Arb. Brit.* vol. i. p. 55. "*Mem.* '1761, May 17. Invited by Mr. Sharp, of South Lodge, on Enfield Chase, to dine and see the Virginia dogwood; the calyx of the flowers (wonderful to see) are flowers as large as figured by Catesby, and (what is strange) it is the only tree that has these flowers amongst many hundreds that I have seen, and it began to bear them in 1759.'" (*H. C.* p. 15.)

The Fulham Nursery. "*Mem.* '1760, Oct. 4. An American cluster nut, sent me by Christopher Gray, the greatest nurseryman between Parson's Green and Fulham: his garden on both sides the King's Road.'" (*H. C.* p. 15.)

Córylus Colúrna. "*Mem.* 'The Turkey nut, in the Mill Hill garden, is very remarkable from all others, for the husk rises high, and branches out every way, and covers the nut. This is a remarkable acquisition, for the captain that brought them from Turkey, eating them in a drinking-room, one of them dropped into the crack of a rotten window board, where it took root: my gardening friend, Mr. Bennett, coming there and seeing it, transplanted it to his garden, from whence our tree was a layer, and brought here anno 1756.'" (*H. C.* p. 15.)

Gymnócladus canadénsis. "*Mem.* 'Mr. Du Hamel sent me a Bonduc, from

Paris, and planted in my garden, May 19. 1763. In this year of the peace Mr. Buffon sent me another.' " (*H. C.* p. 23.)

Hypéricum Kalm*iànum* smells like *Reséda*. (*H. C.* p. 25.)

Junìperus caroliniàna, and *J.* virgínica. " Miller, as well as Mr. Collinson, has followed Hermann and Boerhaave in arranging *J.* caroliniàna and *J.* virgínica as separate species, and Miller says that the difference is constant, if the seeds are carefully gathered from the same tree, but that they frequently arrive mixed together from America, which has occasioned them to be mistaken for varieties." (*H. C.* p. 27.)

Junìperus phœnícea. " Cedar of Phœnicia vulgo, brought by Sir Charles Wager from the Island of Ivaca, in the Gulf of Malaga, when he carried Don Carlos to Naples, not before in our gardens; it is also called *Junìperus* hispánica." (*H. C.* p. 27.)

Junìperus thurífera. " Extract of a letter to Mr. Collinson from Mr. Bowles, intendant of the Spanish mines, and dated Madrid, March 4. 1766: 'There are sweet-scented junipers in Spain, with red, purple, and brownish berries, and some of them grow monstrous large in the south-east mountains, near the source of the river Tagus; their leaves and smell are exactly like savin, and full of berries; I measured one of these trees, 14 ft. in girth, and wide-spreading, like a beech.' " (*H. C.* p. 27.)

Làrix americàna. " *Mem.* 'Black larch, first brought from New York by P. Collinson at Peckham,' and from the original tree the specimen which Mr. Lambert has figured was taken. Sir E. Smith, in *Rees's Encyclopædia*, says that this interesting tree 'was cut down about the year 1800 to make a rail by its sapient possessor.' " (*H. C.* p. 28.)

Ligústrum vulgàre var. " Collinson, as well as Miller, appears to have considered the evergreen privet to be a separate species; and the latter, when he adopted the Linnæan nomenclature, called it *L.* itálicum." (*H. C.* p. 29.)

Liriodéndron Tulipífera. " *Mem.* 'The tulip tree, at Waltham Abbey, in flower June 26. 1745, 96 ft. high, and 9 ft. round, or 3 ft. in diameter, is now, 1761, the largest tree. In 1756, the famous tulip tree in Lord Peterborough's garden, at Parson's Green, near Fulham, died; it was the tallest tree in the grove, above 70 ft. high, and perhaps 100 years old, being the first tree of the kind that was raised in England, and had for many years the visitation of the curious to see its flowers and admire its beauty, for it was as straight as an arrow, and died of age by gentle decay; but it was remarkable, the same year this died, a tulip tree I gave Sir Charles Wager flowered for the first time, whose house and garden was opposite to Lord Peterborough's, and this tulip tree I raised from seed, and was thirty years old before it flowered. So Parson's Green is not likely to be without a tulip tree. — *P. Collinson, F.R.S.*' In the catalogue it again appears under another letter as the 'Arbor Tulipifera an Liriodendron *Catesby*.' In the *Catalogus Plantarum*, published by a Society of Gardeners in 1730, it is said that 'this tree was formerly preserved with great care in greenhouses, by which means many of them were destroyed.' " (*H. C.* p. 31.)

Lýcium chinénse. " *Mem.* 'In the spring, 1752, my honoured friend, the Duke of Argyle, presented me with the curious trees and shrubs undermentioned, from his garden at Whitton, on Hounslow Heath," and among them is, 'one China purple-flowered lycium, sent from China to the Duke for the tea tree.' This lycium is the supposed 'true tea tree' mentioned in a letter of Collinson's, which my friend Dawson Turner has printed at p. 391. of his 'Extracts from Dr. Richardson's Correspondence.' " (*H. C.* p. 32.)

Lýcium ruthénicum. *L.* sibíricum flowered for the first time in 1769; flowers purplish; new. (*H. C.* p. 32.)

Archibald Duke of Argyle. See *Arb. Brit.* vol. i. p. 57. " The following memorandum appears to have been written by Mr. Collinson soon after the decease of His Grace, and is not among the notes which Mr. Lambert has published in the *Transactions* of the Linnæan Society. 'The Duke of

Argyle, on the 15th of April, 1761, died as he sat in his chair, my honoured friend and great patron of all planters, aged seventy-nine, a very hearty man of that age. In the year 1723–4, he took in a part of Hounslow Heath, to add to a little farm, and began planting by raising all sorts of trees and shrubs from seeds from our northern colonies, and all other parts of the world ; he had the largest collection in England, and happily lived to see to what a surprising maturity they had arrived in thirty-seven or thirty-eight years. Great was his benevolence, for he gave to every one to encourage planting, and raised plants on purpose to oblige the curious at this seat of his called Whitton. He had a fine collection of rare birds and beasts; he was a great chemist, natural philosopher, mechanic, astronomer, and mathematician. He was a wonderful amiable man, plain in his dress, without pride or vain ostentation ; his library was scarcely to be equalled. He was forty-one years old when he began to sow seeds for his plantations.'" (*H. C.* p. 32.)

*P*làtanus orientàlis, said to have been first planted at Lord Verulam's seat, now Lord Grimston's, near St. Albans. (*H. C.* p. 41.)

Peter Collinson, F.R.S. See *Arb. Brit.* vol. i. p. 54. "Mr. Collinson resided at Peckham from his infancy, till he removed to Mill Hill, after which it appears not unlikely that his brother lived in the old family house ; and as Mill Hill, prior to the removal, belonged to his father-in-law (Mr. Russell), he may probably have enjoyed the use of both gardens for a much longer period than he occupied them. Dr. Fothergill, in his Memoir of Collinson, says: 'It was a favourable circumstance to himself, that he was in partnership with his brother James Collinson, in a business that did not always require their attention together. They lived in great harmony, and reciprocally afforded to each other opportunities for their respective pursuits. Both, however, had a strong relish for horticulture and planting, and both had acquired a just conception of rural elegance.'" (*H. C.* p. 42.)

*P*ùnica *G*ranàtum. "*Mem.* 'Oct. 2. 1767. On south walls at a gentleman's garden at Parson's Green, and at Gray's Nursery Garden near the same place, I saw three pomegranate trees, full of fruit, without any covering or art, of a beautiful red colour ; I measured one fruit 9 in. round ; there were many more near the same size, and some less. I eat one little inferior to those brought from abroad; perfection can't be expected in our climate, but the novelty and beauty of the scarlet blossoms and fruit deserve the best south (or south a point or two to the east) wall in every curious garden. In the years 1759 and 1760 these trees had fruit on them ; 1758 no fruit.' In other memoranda the pomegranate is mentioned to have fruited at Mill Hill, and that 1757 was 'remarkable for plenty of nuts, peaches, and nectarines, and all sorts of plums, though few apricots, and that in 1758 there was great plenty of nuts and apples.' 'Oct. 10. 1765, visited my friend Mrs. Gaskry, at Parson's Green, near Fulham ; this long hot dry year has had remarkable good effects on all wall fruits ; apricots, peaches, and nectarines ripened much earlier, and have been excellent, but the most remarkable was the plenty of pomegranates ; near two dozen on one tree, of a remarkable size, and fine ruddy complexion, of the size of middling oranges, and one that was split shewed the redness and ripeness within.'" (*H. C.* p. 43.)

Robín*ia* híspida. "*Mem.* 'Sir John Colliton, at Exmouth, one of the proprietors of Carolina, had sent him from thence the first red acacia, anno 1741;' and from his inability to find a plant in the neighbourhood of London, in 1748, Catesby's figure appears to have been taken from a dried specimen." (*H. C.* p. 46.)

Salisbùr*ia* *a*diantifòlia. "*Mem.* 'June 9. 1767. Mr. Gordon, senior and junior, dined at Mill Hill, and brought me in a pot what Dr. Kæmpfer, in greatly mistaken, this tree remained there against a south wall." (*H. C.* p. 48.)

*S*àlix babylónica. " *Mem.* ' Mr. Vernon, Turkey merchant at Aleppo, transplanted the weeping willow from the river Euphrates, and brought it with him to England, and planted it at his seat at Twickenham Park, where I saw it growing, anno 1748. This is the original of all the willows in our gardens. In July, 1765, I measured a weeping willow at Mr. Snelling's, at Godalmin, Surrey, of but fifteen years' standing; it measured 6 ft. in girth, or 2 ft. in diameter, and the height in proportion.' In the first edition of the *Hortus Kewensis*, on the authority of L'Heritier's *Sertum Anglicanum*, this species is said to have been first introduced in 1730, but the date in the second edition has been altered to 1692, from a reliance on Plukenet's, t. 173. f. 5. which, on examination of the original specimen at the British Museum, I found to be an entirely different plant. By the *Catalogus Plantarum*, published by a Society of Gardeners, in 1730, it appears then to have been cultivated in our nurseries." (*H. C.* p. 48.)

*S*pártium júnceum fl. pl. " *Mem.* ' I first introduced the Spanish broom with double flowers; it was sent me from Nuremberg, anno 1746, in a pot nicely wickered all over; it cost there a golden ducat; came from thence down the Elbe to Hambro', and was brought by first ship to London, in good order. I soon inarched it on the single-flowered broom, and gave it to Gray and Gordon, two famous nurserymen, and the public soon had it from them.' " (*H. C.* p. 52.)

Syringa vulgàris álba. " *Mem.* ' Lord Petre was particularly fond of the white lilac, and directed his gardener to gather none but white seed; he raised more than 5000 plants that flowered in 1741, and out of that number but about twenty came white, the rest all blue, so that white seems to be only a seminal variety from the blue.' " (*H. C.* p. 54.)

*V*íscum álbum, the mistletoe, has been found by Mr. Knowlton growing on the following trees. " 1. On the lime tree at Bone Gate, East Barnett and Cannons, Duke of Chandos, Edgeware. 2. On nuts and filberts at Market Street. 3. On the mountain ash or quick beam. 4. On apple trees. 5. On the crabs. 6. On white thorn. 7. On the acacia or robinia. 8. On the pear tree. 9. On the maple, in Yorkshire and Huntingdonshire. 10. On *A*'ria Theophrásti, or white beam, on Sussex Downs. 11. On the abele or poplar, at Ashton, near Rotherham, and at Lord Holdernesse's. 12. On the ash at Lord Tilney's, at Tilney Park, in Hampshire. 13. On the elm; 14. On the willow; 15. On the buckthorn; 16. On the sallow: 17. On the service; these all were observed at Esquire Blackburn's, and in Lancashire, and in Westmorland, in 1764. 18. On a holly branch, which was at a druggist's in Bow Lane, Cheapside. 19. On a Virginia walnut tree, growing in our fields at Mill Hill. 20. On the oak (which is very rare), Mr. Knowlton has twice seen it. In August, 1765, three plants were found growing on the oak on the estate of —— White, Esq., at Watling Wells." (*H. C.* p. 57.)

The following are dimensions of trees in the grounds of *Flitwick House*, the seat of John Thomas Brook, Esq., near Ampthill, Bedfordshire. The circumference is taken at 1 ft. from the ground.

Quércus pedunculàta, 17 ft. girth, and 70 ft. high; 14 ft., and 60 ft. high; 14½ ft., and 65 ft. high; and 18 ft. and 70 ft. high.
*F*ráxinus excélsior, 10 ft. 3 in. girth, and 60 ft. high.
*T*ília europæ'a, 7 ft. 8 in. girth, and 65 ft. high.
U'lmus campéstris, 18 ft. girth, and 60 ft. high.
*F*àgus sylvática, 11 ft. 6 in. girth, and 65 ft. high.
A'cer Pseùdo-*P*látanus, 7 ft. 6 in. girth, and 58 ft. high.
*C*árpinus *B*étulus, 7 ft. girth, and 50 ft. high.
*L*àrix europæ'a, 7 ft. 6 in. girth, and 80 ft. high.
*C*èdrus Libàni, planted in 1818, 4 ft. 3 in. girth, and 30 ft. high.

A'bies excélsa, 8 ft. girth, and 70 ft. high.
Pícea pectinàta, 8 ft. girth, and 70 ft. high.
Pìnus sylvéstris, 8 ft. 6 in. girth, and 65 ft. high.
Pìnus Pináster, 9 ft. 6 in. girth, and 75 ft. high.
Pìnus Stròbus, 6 ft. girth, and 60 ft. high.
Juníperus virginiàna, 5 ft. girth, and 40 ft. high.
I'lex Aquifòlium, 3 ft. 10 in. girth, and 30 ft. high.

The following are the dimensions of young trees in the arboretum at *Flitwick House*, which was planted in the autumn of 1829.

Magnòl*ia* conspícua, 10 ft. 6 in. high. Length of last year's shoots, 3 ft.
Ailántus glandulòsa, 3 ft. 4 in. girth, and 25 ft. high.
Kölreutèr*ia* paniculàta, 1 ft. 6 in. girth, and 10 ft. high.
*Catálpa syringæ*fòlia, 3 ft. 3 in. girth, and 14 ft. high.
A'rbutus Andráchne, 1 ft. 6 in. girth, and 7 ft. high.
Quércus Cérris, 1 ft. 10 in. girth, and 19 ft. high.
Quércus Cérris Rágnal, 2 ft. 5 in. girth, and 20 ft. high.
Juníperus sinénsis más, 11 ft. 6 in. high; and J. s. fœ'mina, 8 ft. 6 in. high.
Pìnus hispánica, 8 ft. 6 in. high; shoots of last year, 2 ft. 2 in.
Pìnus Pináster fòliis variegàtis, 10 ft. high.
A'bies Douglàs*ii*, 2 ft. 5 in. girth, and 23 ft. high; circumf. of branches, 17 yds.
Araucària imbricàta, 9 ft. high. — *J. T. Brooks. April* 29. 1843.

ART. XV. *Result of an Experiment made in endeavouring to propagate the* Gladìol*us cardinàlis.* By ANDREW MACKENZIE.

IN your tour through Scotland in the summer of 1841, when calling at Blair-Adam, among other things you observed the Gladìolus cardinàlis growing in great perfection, and wished me to send you my mode of culture for the *Gardener's Magazine*, which I did (see our Vol. for 1841, p. 461.); and in that article I promised to give you an account of an experiment which I had previously made, by dividing a large ball of the Gladìolus cardinàlis into single bulbs, and planting them in a bed in the usual way. This was done early in the spring of 1841, and that season only two small flowers made their appearance; yet most of them stood the following winter without any protection; but the leaves were much smaller.

In 1842 only one half of the bed came up, and all the plants were very sickly, and none of them came into flower; and in 1843 only one solitary leaf came up: so that all the bed of single bulbs have perished. Had the large ball of which this bed was composed been planted by itself, it would have produced by this time from fifteen to twenty large trusses of flowers; or, propagated in the manner recommended in your Vol. for 1841, p. 461., would have filled a bed.

From the above experiment, the readers of the *Gardener's Magazine* will see the necessity of adopting the plan which I recommend, viz. of planting the Gladìolus cardinàlis in balls or clusters of corms.

Blair-Adam Garden, Oct. 10. 1843.

REVIEWS.

ART. I. *Catalogue of Works on Gardening, Agriculture, Botany, Rural Architecture, &c., lately published, with some Account of those considered the more interesting.*

TREATISE on the Management and Cultivation of Forest Trees. By John

&c. 8vo, pp. 164, with seven lithographic plates and several woodcuts. Glasgow, Edinburgh, and London, 1843.

We regret we cannot say a single word in favour of this book. If the author had been well advised, it would never have seen the light.

Arboriculture: A Paper read before the Geological and Polytechnic Society of the West Riding of Yorkshire. By James Hamerton, Esq. 8vo. Leeds, Bains.

"Like us, he does not object to a little pruning when trees are very young; but then only, and in cases of absolute necessity, would he permit it." (*Dr. Lindley*, in *Gard. Chron.* 1843, p. 698.)

Guide to the Conservatory; being a concise Treatise on the Management of the Hothouse and Greenhouse; the Forcing of Bulbs, Shrubs, &c., and the best Mode of keeping a Succession of Bloom through every Month of the Year, exemplified in a select List of the most admirable Plants of the present Day under the Arrangements both of Jussieu and Linnæus, including their native Country, Propagation, and the Soil adapted to each. By Richard Bainbridge, Flower-Gardener to the Right Honourable Lord Wenlock. From Notes of the Author's Daily Practice, and Communications furnished by liberal eminent Floriculturists. 12mo. London, 1842.

Noticed as being in the press, in our Vol. for 1841, p. 628.

Flora Odorata; a characteristic Arrangement of the sweet-scented Flowers and Shrubs cultivated in the Gardens of Great Britain, with Directions for their Propagation, Management, &c. &c. By Frederick J. Mott. fcp. 8vo. London and Leicester, 1843.

A. Paul and Sons' Catalogue of Roses for the Autumn of 1843, *and Spring of* 1844. Pamph. 8vo, pp. 20.

Catalogus Plantarum Cæsarei Regii Horti prope Modiciam ad Annum 1842. Catalogue of the Plants in the Royal Botanic Garden of Monza near Milan in the Year 1842. 8vo, pp. 207. Milan, 1843.

M. Manetti, the director of the Monza Garden, and the author of the Catalogue, informs us in his preface that it has been compiled in obedience to the commands of His Serene Highness Prince Rainer, a nobleman of great botanical acquirements, in consequence of the vast influx of plants since 1826, when the previous list was made out. The nomenclature is, for the most part, that of DeCandolle and Sprengel. Want of leisure prevented him from making the Catalogue as comprehensive as he could wish, but he hopes at some future time to arrange the whole on the plan of our *Encyclopædia of Plants*, and thus render it "a source of pleasure and instruction both to the botanist and the gardener."

The Catalogue is in alphabetical order; and after each specific name, the authority, the habit of the plant, whether a tree, whether ligneous or herbaceous, perennial, biennial, with male or female flowers, &c., and its native country. The garden seems very rich in species. On turning to the genus Cratæ'gus we find 29 species and 17 varieties. Three of the species, *C.* coronàta *Wendl. fil.*, *C.* pruinòsa *Wendl. fil.*, and *C.* sphæ'rica *Wendl. fil.*, we are unacquainted with under these names.

The Catalogue has been got up with very great care, and is highly creditable to its author. It will be found useful to collectors in this country, as it contains a number of species little known in England.

A Treatise on the Culture of the Vine in Pots. By J. Mearns, F. H. S. 12mo. London, 1843.

A Comprehensive Practical Treatise, or a New Era in the Culture of the Vine under Glass, &c. By James Roberts, Gardener to M. Wilson, Esq., Eshton Hall, near Skepton, Yorkshire. 12mo. London, 1843.

Culture of the Grape Vine in Australia and New Zealand, with Remarks on the Vineyards of Europe, Asia, &c. By George Sutton, F.L.S. 8vo. Lond. 1843.

Elements of Practical Agriculture, comprehending the Cultivation of Plants, the Husbandry of the Domestic Animals, and the Economy of the Farm. By David Low, Esq., F.R.S.E., Professor of Agriculture in the University of Edinburgh, &c. &c. London and Edinburgh, 1843. 8vo, pp. 817, and numerous wood-cuts.

In the present edition the author informs us he has "entered somewhat more than in the previous ones into an explanation of what may be termed principles." The soil, the external agents which influence it, and the nature of those substances which, when added to it, increase its productive powers, have been enlarged on. In various parts of the work it has been endeavoured to show "the mistaken applications which may be made of principles to the practice of the farm, and the errors into which persons little conversant with practice are apt to fall, with respect to the kinds and degrees of knowledge required to be possessed by the practical farmer."

The author has evidently been roused by the attention recently paid to the chemistry and geology of agriculture by the English Agricultural Society; and by the very remarkable fact, that the agriculturists of Scotland have joined together, and agreed to give an eminent chemist 500*l.* a year for analysing soils, besides an extra payment for each analysis. It would thus appear that the practical men are taking the initiative of the professor.

In the chapter on the Chemical Analysis of Soils, after enumerating the various matters which enter into their composition, "soil being in fact one of the most compound substances in nature," the following conclusion is arrived at. "The farmer is able to determine the nature of his soil by its texture, its depth, its productiveness of plants, and other sensible properties, and, happily, the knowledge so attained is sufficient for all the ends of useful practice."

"A knowledge of the intimate chemical constitution of the soil is highly worthy of being obtained, and the subject would deserve to be pursued by men of science, were there no other aim or result than the resolving of chemical and physiological questions. But too much must not be looked for from such enquiries, as teaching the farmer new methods of practice. The farmer knows, for the most part, better than the chemist, when a soil is good or bad, when it is improvable by ordinary means, and when it is too barren to repay the expenses of culture; and he knows better than the chemist how to keep it clean, dry, and as productive as the means at his command will allow, with a due reference to return as compared with the expenditure. But this latter knowledge is not derived from the laboratory, but the fields, and is a branch of a practical business, in which chemistry can render little aid. Whatever results chemical analyses of the soil may hereafter conduct us to, it must be admitted, that as yet they have been interesting to the scientific enquirer rather than useful to the farmer. Every garden and well-cultivated field shows that the soil may be brought to its maximum of fertility without dependence on any conclusions yet arrived at by the physiologist and the chemist. Perhaps not more than a dozen of chemical analyses of soils have yet been made in Europe, sufficiently exact to aid the purposes of science, while the great mass of those which are made, and communicated to farmers as something necessary or useful to them, are equally worthless for science and practice." (p. 23.)

The chapter on the Geological Relations of Soils is entirely new, or at least it is not in the second edition (the third we have not seen). After going over the different formations, and showing that the soil of any tract may be totally different from what the rocks on which it rests, or which abound in its vicinity, might lead us to suppose, from the intermixture of soils or debris of rocks brought fro

"We see, therefore, that the mere knowledge of the geological formations of a country does not afford the data for determining the nature and properties of the soils in the manner required for practice. Speculative writers, indeed, have maintained that a knowledge of geology is not only eminently useful to the practical farmer, but even necessary to enable him to distinguish soils, and adopt the suitable means of improving them. It is surprising that such statements should be hazarded. The farmer, as all experience shows, can distinguish soils by their agricultural characters much more certainly and readily than the geologist can by their geological; and it does not appear in what manner geology can give that knowledge to a farmer which can enable him to cultivate and improve his land. The farmer, it is manifest, must regard the soil which he has to till, not in its relations with a whole district, but with reference to its own characters and fertility. He may find the soil, not only of a single farm but of a single field, varying in every degree; and it will be necessary that he adapt his management to these variations, whatever be the geological formation in which he may be placed. It were greatly to be desired, indeed, that the practical farmer would acquire a knowledge of geology, and learn to read a portion of that marvellous history which is written on every rock and mineral bed around him. Such a knowledge would give a charm to rural pursuits, and connect a liberal and interesting study with the observations of daily life; yet such a knowledge, however excellent, will not enable the farmer to discriminate soils better for the ends of practice, much less enable him to cultivate them with greater skill, which is knowledge he must derive from agriculture, and not from geology." (p. 45.)

With a view to the immediate application of knowledge to practice, we entirely agree with Professor Low. No chemical analysis or geological section of a soil would induce us to take a farm on the strength of the data they afforded; but, if we saw or had a list of the plants either indigenous or cultivated which grew on the soil, we should offer rent for the land without the slightest hesitation. But we have already stated this in the *Encyclopædias* both of *Agriculture* and *Gardening*. Nevertheless we readily acknowledge that it would add to our confidence in the productiveness and improvableness of a soil, and perhaps lead to improvements that we do not even contemplate, to know that it contained a considerable proportion of lime and other alkaline earths and mineral salts; and we think the importance of this kind of knowledge, in connexion with that of the analysis of plants, has not been overstated by such agricultural chemists as Professor Johnston and others, though this knowledge may not yet be in such a state as to be available by the rent-paying farmer. There is a very short method of improving the agriculture of England, if landlords would agree to it: that is, granting 21-years' leases, and requiring at least half the rent in kind, or kind's value; but for this the landlords must first be visited by such a degree of poverty as will render a greater income from landed property necessary, or such a degree of liberality as will induce them to treat their tenantry as independent men, and not, as at present, as a set of political slaves.

Illustrations of Indian Architecture. By Markham Kittoe, Esq. Parts IX. to XVII. inclusive. Oblong 4to. Calcutta and London.

Our notice of this work in our Volume for 1840 will show the favourable opinion which we have of it. The numbers before us increase in interest as they proceed; they abound in a great many curious specimens of Indian design, which are calculated to assist the inventive powers of the artist not only in Indian architecture, but in architectural composition generally. They are particularly rich in specimens of parapets, and what are called jali, or stone trelliswork. Many of the latter designs afford excellent hints for sincerely hope he will be able to effect his object, and, what is still more desirable for himself, recover his health, and enjoy the result of his labours for many years.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Parchment Labels. — Some nurserymen use these without any preparation, writing on them with ink; others slightly moisten the surface of the label and write with a black lead pencil, or with ink; some, as Sir Thomas Frankland (see *Hort. Trans.*), write with Indian ink instead of common ink; others again rub a little white paint on them, as is done in writing names on wooden tallies; but the mode at present considered most efficient is to rub the surface of the parchment with white lead mixed with a little red ochre, and write with a black lead pencil. The writing thus made, Mr. Rivers informs us, is so durable, that he has seen the labels quite readable at the end of the second season, though exposed to the weather the whole of the time.—*Cond.*

Garden Pots. — "I have just made a good improvement on the common flower-pot, which deserves to be universally adopted. The shape, size, and expense are not altered. I have done away with the hole at the bottom altogether; and, instead of the flat bottom, the maker pushes in the centre of it, like the bottom of a common black glass bottle, only not with so sharp a turn inside, and the drainage-holes are round the sides at the bottom. From 2 to 6 holes, according to the size of the pot, will do all the business of drainage. The roots cannot get through the bottom, neither can the worms get in, and water cannot hang under the pot in winter, which, for heaths, is the best part of the change." (*D. Beaton*, in *Gard. Chron.* 1843, p. 372.)

Application of the Principle of the Balloon to Landscape-Gardening. — It is often desirable to know the effect, and more especially the height, which tall-growing trees will have when full grown. On a level surface this is comparatively easily ascertained by means of trigonometry or perspective; but in the case of an irregular surface on hills, or in irregular narrow valleys, it has only been satisfactorily done hitherto by fixing in poles of spruce fir, such as those used by builders in their scaffolding. A more economical mode would be to have small balloons, say balls of balloon silk of a foot or 18 in. in diameter, which might be filled at the nearest gas-house; to have a cord attached to each ball of considerable length, say 150 ft., with the opposite end of the cord attached to an iron reel like that of a garden line. This reel would serve as an anchor to the balloon, and the line might be let out to such an extent as the tree intended to be planted was expected to attain in height. In all this there would be very little expense; but balloons as large as trees might be formed, and thus groups and plantations of various kinds held in suspension in the atmosphere in such a manner as to show with greater accuracy than has hitherto been done, the ultimate effect that would be produced at particular parts of parks or pleasure-grounds by planting. Even buildings might be exhibited in this way. Calm weather, of course, must be chosen for such experiments.—*Cond.*

A Trap for the Wire-worm. — Edge the beds in which you have florist's flowers growing in fresh soil with daisies. Wire-worms will concentrate their attacks on the roots of the daisies and leave the plants in the beds untouched. From one row of daisies 300 ft. long, 2000 worms were taken in one day during summer. The daisy, being a free-growing plant, is able to exist notwithstanding the attacks of the worm. (*S. Oram*, in *Gard. Chron.*, 1843, p. 693.)

we recommend all apprentices and journeymen gardeners, who are in good health, and can wrap themselves well up, to travel in third class trains. A young nurseryman who has been through great part of France, Germany, and Belgium, and who belongs to Russia, has lately passed 6 or 8 months in England. He has been all over the country, and also in Ireland and Scotland; he speaks and writes four different languages, is an excellent draftsman, and a scientific botanist. He was supported by his family, who are wealthy; but he never, either on the Continent or in this country, travelled otherwise than by a third class train. He observed to us, that when he jumped out of one of these trains, well wrapped up in his cloak, he was the same man as if he had come out of a carriage of the first class, with this difference, that he had a good deal more money in his pocket. On mentioning this to a gentleman at Southampton worth at least 30,000*l*., he told us he did exactly the same thing when none of his family were travelling with him.—*Cond.*

To dry moist Air.—Chloride of calcium has so great an affinity for water that it absorbs it completely from any confined atmosphere, rendering it quickly and perfectly dry. For closets or rooms thoroughly air-tight, containing books, papers, or dried specimens of plants, this substance must be extremely useful in the winter time, when the windows cannot be opened, and where, perhaps, there are no fireplaces. It may also be useful in vineries, where late crops of grapes are kept hanging on the trees.—*Cond.*

Wooden Houses, of every kind, from the summer-house to houses for curates and rectors, of from four to ten rooms each, we observe by the advertisements, are manufactured by our friend Peter Thompson. They are constructed of Payne's anti-combustic wood, and sold either for home use or exportation, and at incredibly low prices. Mr. Thompson has published a small book of such buildings, with their prices, from which a choice may be made; and it will be borne in mind that houses are exported duty free.—*Cond.*

The "Rule" and the "Reason."—Horne Tooke, when at Eton, was one day asked by the master the reason why a certain verb governed a particular case? He answered, "I don't know." "That is impossible," said the master, "I know you are not ignorant, but obstinate." Horne, however, persisted, and the master flogged. After the punishment, the master quoted the rule of grammar which bore on the subject, and Horne instantly replied, "I know that very well; but you did not ask me for the *rule*, you demanded the *reason*." Gardeners will do well constantly to bear in mind the difference here pointed out. A principle ought always to be the foundation of a rule, which is nothing more than a precept taken from the principle; and applicable, not universally, but only to a certain number of cases. A principle is of universal application.—*Cond.*

Approaching Similarity of Manners all over the World.—A writer in the *Edinburgh Review* for Feb. 1843., p. 144., laments the influence of railroads in assimilating the social and domestic character of our provincial towns to that of the capital. There is no originality in the country, he says; no escape from the eternal repetition of men and things. "Fifty years ago the manners in London differed essentially from those in country towns, and those again from each other," and so on. In our opinion, it is the coming glory of railroads, that they will equalise social and domestic character, as far as climate, government, and other physical and geographical circumstances will permit, all over the world, till at last we have only one prevailing living language, one the apple or pear. The only precaution that is necessary in this operation is, to take prominent buds from the first growth of this season, as many of the family have made a second growth this month. Variegated hollies may now be grafted and budded with the greatest freedom. The rhododendron being thin-rinded, it does best by side grafting, and buds of it also had better be inserted after the manner of side-grafting, with a portion of the soft wood retained behind the bud; all autumn buds may thus be inserted. I scarcely ever used clay in the first instance for excluding the air from these experimental buds and grafts, so that, with this useful precaution, there will be no fear of success. The following observations may be useful to those little versed in these matters. Insert autumn grafts as you would buds, leave about an inch of the graft out, at the top of the incision, and use the firm part of this summer's growth for the stock. If the bark of the stock be very thin, or if it does not part freely from the wood, you had better put in the grafts and buds as in side-grafting, cutting out a thin slice, and preparing the grafts so as to fit the place; and tie rather gently, as the stock is soft, for fear of bruising the bark. If the graft be put in on the north side of the stock, it will be an additional security from the heat of the sun. The best grafting clay is made by putting a lump of soft clay in the bottom of a small pot, with a little water over it; then stir it with a stick until it is rather thicker than paint, and with a small brush, made with strips of matting tied to a little stick, paint over the tying; and, while the paint is wet, dust a little dry sand or mould over it. When it becomes dry, no rain will wash it off, and the sand will keep it from cracking. (*D. Beaton*, in *Gard. Chron.* for Sept. 2. 1843, p. 616.)

Disbudding Shoots with the Leaves on. — This is practised by Mr. James Roberts, the author of the *Culture of the Vine under Glass*, a book that ranks with the *Treatise* of Mr. Hoare. While the leaves are yet green, the shoots or spurs are divested of such buds as are not intended to produce fruit the following season. The result of this is, that the organisable matter prepared by 50 or 100 leaves is concentrated in 20 or 30 buds, instead of being divided among three or four times that number, as it is by the general system of management. Though this is merely an extended application of the principle of the concentration of the sap practised in disbudding and various allied operations, yet it is one of immense importance when applied to the vine, and to the shoots of ligneous plants with the leaves on. The buds, in consequence of having so much sap concentrated in them, become highly excitable, and, with the slightest application of heat in early spring, they push with the greatest vigour. There may, under certain circumstances, be a fear of the premature bursting of the buds; but this, in general, may be prevented by leaving two or three small laterals on the most vertical part of the vine. Though Mr. Roberts, who is decidedly the inventor of this system, has chiefly applied it to vines under glass, yet it is said to be equally applicable to out-of-door vines. Of course, if it is applicable to one bud-bearing plant, it must be applicable to all, whether ligneous or herbaceous. "You may," Mr. Roberts observes, "proceed to disbud, beginning at the bottom of the vine, leaving a bud you think well placed on the side of the shoot (preferring that to either the top or under side); then cut clean out the two following, leaving the fourth, taking out the next two, and so on till you reach 8 or 9 feet in height, as to that length the cane must be cut back. Proceed again at the bottom, disbudding the other side in the same manner, so that, in that length, you will be able to leave eight or ten permanent eyes to form fruit-bearing spurs for the following year, or five on each side. I particularly caution against injuring the leaves when the bud is cut out, as they may not naturally drop for weeks after, and may yet be useful in more perfectly maturing the stem and remaining buds. In a few days the wounds or cuts will have dried up; touch them with a little paint, keep them cool and dry until the leaves have commenced dropping generally." (*W. P. Ayres*, in *Gard. Chron.* for 1843, p. 677.)

An imperishable Bread, made of flour and rice meal, and in every respect well tasted and wholesome, is said to have been invented by Mr. Alzard.

The bread, it is said, will keep two centuries without the slightest alteration, if required. If this should really be the case, it will, of course, supersede in a great measure the troublesome modes of preserving wheat in sieves, and other underground excavations, now practised on the Continent, and indeed, together with rice, in most parts of the world. (*Standard.*) The Arab in Egypt generally buries his rice to conceal it from his enemies; often, as St. John informs us, in the floor of his miserable mud hut. — *Cond.*

Verbenas and Petunias. — After seeing all about London, and collecting nearly fifty varieties of the verbena, I reduced them to twelve sorts, and three or four of these are for neutral beds; that is, beds with no decided colour. Petunias must be dealt with in the same manner. (*D. Beaton*, in *Gard. Chron.* 1843, p. 592.)

Best time for eating Pears. — No pear, if gathered and eaten when fully ripe on the tree, is so good as when gathered as soon as it has attained its full size, and laid by in a dry place until it is ripe. (*J. Hayward*, in *Gard. Gaz.* 1843, p. 153.)

Manuring Vines. — We find several gardeners throughout the country, who have read Liebig's work, manuring their vines with the summer's prunings chopped small, and slightly dug in immediately. Of course the plan will succeed where very slight crops are to be taken, but not otherwise. — *Cond.*

ART. II. *Domestic Notices.*

ENGLAND.

The Naming of the Trees and Shrubs in Kensington Gardens has had, as was anticipated, a beneficial effect upon the public mind, in awakening a spirit of enquiry, and exciting a taste for botanical and horticultural pursuits; so much so, that gentlemen go direct from these gardens to the nurseries, with their lists made out from their own inspection. (*Gard. Chron.*, 1843, p. 695.)

Paulównia imperiàlis has flowered in the greenhouse of Mrs. Wray of Oakfield near Cheltenham. The flowers are deliciously sweet, and are produced freely on very young plants, if forced for that purpose. The conditions to be attended to are, to keep the plants under-potted, to force them slowly in a cool stove, early vinery, or forcing-house, beginning early in the spring. By midsummer they will have finished their growth, have begun to show their flower-buds, and to cast their leaves; they will then require less water, and in six weeks or two months the flowers will begin to expand, and the plants, of course, will be brought into the conservatory, where they will take up little room, as they may be set anywhere, only leaving their heads of flowers free above other plants which surround them. Might not the *Catálpa syringæfòlia* be treated like Paulòwnia for the sake of its large trumpet-like flowers, which are produced in abundance in the neighbourhood of London and farther south, but are seldom to be met with in colder parts of the country? (*Gard. Chron.*, 1843, p. 698.)

American Aloe. — There is a fine specimen of this rarely flowering exotic on the lawn at Charlton House, near this town [Wantage]. The flower stem has already attained the height of 16 ft., with 25 lateral branches, and nearly 4000 blossom buds. It is hoped that when this beautiful plant is fully in flower the public may be admitted to see it. (*Jackson's Oxford Journal*, Sept. 16. 1843.)

SCOTLAND.

Sir Walter Scott's Monument. — It is well known that a number of situations have been from time to time pointed out as proper sites for this monument.

In some of these it would have been founded on a visible rock, and consequently the expense of the foundation would have been trifling, or rather there would have been no expense on that account at all. The committee, however, finally fixed on a situation on the edge of the North Loch, on the south margin of Princes Street, on a piece of made ground, where, in order to procure a sufficient foundation, they have been obliged to dig down 40 or 50 ft., and bury such an immense mass of masonry, that the committee are now coming forward to solicit "auxiliary subscriptions" on account of the "heavy expenses of the substructure." (*Scotsman*, Aug. 30. 1843.) Independently altogether of the "heavy expense of this substructure," we put it to all men of common sense, whether it can be in good taste, in a locality like Edinburgh, where there are innumerable situations that supply foundations of rock rising to the surface, to build a monument, no matter for whom or for what, in a situation where any substructure is required at all. Why not have chosen a spot on the Castle Hill, or perhaps still better the Calton Hill? The idea of burying so much money, where there never can be anything to show for it except the accounts, is in our opinion most repugnant to the feelings of a well-regulated mind, and anything but creditable to the committee. Economy of execution is one of the first things that ought to be attended to in every public or private work whatever. — *Cond.*

ART. III. *Retrospective Criticism.*

THE Improvements in Kensington Gardens. (p. 288.) — While I agree with you in admitting that great praise is due to the Earl of Lincoln, for the wish he has manifested to make the parks about the metropolis minister as much as possible to the instruction, as well as gratification, of the people, I cannot think that he has done well in introducing conspicuously the names of the trees and shrubs into our public gardens. I know that this is a favourite project of yours, and that it has originated in a most benevolent wish to blend instruction with amusement, and so to lead tô a civilisation of our population. But, in the first place, I do not think that the beauty of all our parks ought to be destroyed, and all chance of a high love for the beauties of nature cut off, for the sake of instructing those who will not be at the pains to learn for themselves. Let there be, if you will, botanic gardens, where those who wish may find every kind of plant named, but let our parks be parks, and not schools; and be assured that you will attain your wish more certainly in this way than by the method you propose; for your idler will hardly recollect the name of a plant when he has had no trouble in learning it. And again, see to what your plan naturally leads. The plants are arranged, How? — So as to produce the most beautiful scenery? No. — Well, but so as to show their peculiar properties the best way? No. — At any rate they are grouped in classes, so as to convey broad characters to the observers? No; they are arranged (see p. 288. l. 2.) in alphabetical order! This reminds me of what once happened to me in walking through the conservatories at the Colosseum before they were finished. Finding the gardener disposed to converse, I entered into conversation with him as to the principles on which the planting had been conducted. He spoke in the highest terms, as well he might, of the talents of the extraordinary man who had projected the building and its accompaniments; but added, with a feeling in which he expected me to sympathise (for from our conversation he found that I had some knowledge of plants), that it was a great pity Mr. Horner knew nothing of plants or their value. "Why, Sir, he has arranged them solely with a view to their picturesque effect; and, in spite of my remonstrances, has removed to a distance plants that have cost five guineas, while he has placed in the front row others that are not worth one shilling!" Be it remembered that this was twenty years ago, and that there was more excuse for the gardener then than there would be now. One word more as to the principle you advocate, before I express a doubt as to its practicability. Do ask Mr. Lamb to take up his facile pencil, and give you a design for a public building, the Houses of Parliament, the National Gallery, &c. &c., which shall be an alphabet of architecture; and when he has finished, let each member have its sign-board hung up to tell the babe in architecture that this is an Ionic volute, that a triglyph, &c. &c. Of course he will not consider proportion, or architectural or artistical effect (perish æsthetics, thought, feeling, taste!), but will take care that every member is so large, that, however distant, the eye may see it fully, so as to comprehend its exact form and position: nay, would it not be the best way to have the scaffolding up, that any one who wishes may have an opportunity of a nearer view? Now, if you are consistent, you ought to contend for this in our public buildings, as much as for making our parks a collection of labels. If I have thus broadly caricatured your views, it is because I know they are deeply rooted, and must therefore require a strong effort to change them. I can scarcely hope to succeed; but, seeing that they are beginning to be acted upon in high quarters, I am anxious that, before it is too late, they should be re-examined.

And now as to its practicability. You are already complaining that the names are not sufficiently large; and you must still complain until you get them as big as a sign-board, and entirely destroy all appearance of a garden. The remedy I should propose would be, either the establishment of a botanic garden in connexion with the park, or placing plans of the grounds in some of the structures in the park, with lists of the trees, &c., and proper references, and instructing the attendants to give assistance in finding particular plants to all enquirers.

I had intended also to have made a remark or two on your suggestion that a *ruined* aqueduct should be introduced, but I have not at the present moment the Magazine before me. Kent, I think, planted dead trees in his parks; but he was soon laughed out of the practice. The time will soon come when artificial ruins will share the same fate. — *T. W. Leeds. June*, 1843.

It is seldom that we differ in opinion from this correspondent, to whose taste and judgment we pay great deference. On the present occasion, however, we do not exactly accord with him on any one of the points on which he has touched.

In the first place, we positively deny that the naming of one plant of each and all of the species and varieties in our parks and public gardens would interfere with picturesque effect. There are not above 500 trees and shrubs that are suitable for being planted in public parks where the ground is not dug; and these, by whatever arrangement might be adopted (unless they were all put together in one small enclosure), would be distributed over a great many acres of surface; and, among many thousand trees and shrubs which are not named, we do not see that the labels would intrude themselves, or that any description of general effect would be injured by them, while, to those who took an interest in trees, these labels would be extremely interesting; for the first desire that rises in the mind, when we see a new object with which we are pleased, is to know its name. For one citizen of London that has a taste for picturesque beauty or landscape composition, there are ten thousand that know nothing of either: but that ten thousand may have a curiosity to be gratified, and to them the naming may be a source of interest. We do not think it possible " that a high love for the beauties of nature" can be cultivated in any of the London parks, peopled as they are, from morning to night, with years before any idea was entertained of naming them; and hence one is named here and there without any reference to arrangement, and without the slightest injury to picturesque effect. It is impossible to walk along this belt of trees without being convinced that the names form a great source of interest to the spectators.

With respect to the shrubs that are arranged in alphabetical order, nothing can be worse; but they do not occupy a thousandth part of the surface of the gardens, and, as they will doubtless be removed, they ought not to be considered as a specimen of general arrangement. Had our correspondent seen Kensington Gardens before he produced his remarks, we are persuaded they would have been very different.

With respect to ruins, we think they ought to be very rarely introduced; but we are not so exclusive as to say that they are in no case admissible. On the contrary, there are situations, such as where a stream is led along the side of a slope for the sake of obtaining a waterfall, where a waterfall issuing from a ruined aqueduct or the remains of a mill-course is more natural, if the expression may be used, than any piece of rockwork that can be made. Such, at least, is our opinion. We shall, however, be glad to hear all that our correspondent has to say against ruins.—*Cond.*

Art. IV. *Queries and Answers.*

A curious Caterpillar.— I forward you a very large curious caterpillar, which was found feeding on a geranium. Its excrement is as large as that of a rabbit. When lying quiet its head looks broad and large, and, if touched, it puts out a very long trunk or snout, like a pig's.—*James Barnes. Bicton Gardens, Sept.* 21. 1843.

[We sent the caterpillar to Mr. Westwood, who returned us the following observations on it.]

Mr. Barnes's caterpillar is that of the common elephant hawk moth (Sphínx, or Chœrocámpa, Elpènor), figured by Mr. Humphreys, in his beautiful plates of the English moths (vol. i. plate 5. fig. 7.), from a specimen "taken at Bayswater, in the possession of Miss A. Loudon;" together with the caterpillar (fig. 8.), which, by the by, has the tail represented much too small, and the spottings of the body too faint. The curious property mentioned by Mr. Barnes, of stretching out the fore segments of the body into a long neck, is well known, and has led to the application of elephant moths to these insects. The French call them cochonnées; and, from this circumstance, M. Duponchel has made them into a separate genus with the name Chœrocámpa, from two Greek words, signifying a hog and caterpillar; that is to say, a caterpillar with a snout like that of a hog.

I have not before heard of this insect feeding on geraniums. Its ordinary food is the ladies' bedstraw, willow herb, and vine; but other instances of a similar change of food have been noticed, as in the case of the swallow-tailed moth which you sent me a little time since (see p. 460.); whilst a friend of mine has lately reared a specimen of the carpet moth (Euthàlia impluviàta) from a caterpillar which also fed upon the geranium, its ordinary food being the birch and hazel.

Mr. Barnes's specimen had formed for itself with the bits of grass, &c., with which he had packed it in the box, an oval bed, within which it was coiled up, to undergo its chrysalis state; but I fear it has got injured during its passage through the post-office and letter-carrier's hands.—*Jno. O. Westwood. Grove Cottage, Grove Road, Hammersmith, Sept.* 23. 1843.

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THE GARDENER'S MAGAZINE,

DECEMBER, 1843.

ORIGINAL COMMUNICATIONS.

ART. I. *Bicton Gardens, their Culture and Management, in a Series of Letters to the Conductor.* By JAMES BARNES, Gardener to the Right Honourable Lady Rolle.

(*Continued from* p. 606.)

LETTER XXIV. *System of Cucumber-Growing.*

I BEG to take the present opportunity, having half an hour to spare, of making a few remarks on my *system of cucumber-growing,* which is a very easy and simple method.

I believe there is no one thing in the whole practice of gardening that has caused more contention amongst gardeners of all classes than cucumber-growing; neither do I believe there is any one thing that has had more treatises written on it. Many of these, I make no doubt, have proved useful; but I am in no way acquainted with the contents of any of them, never having seen but one work on the growth or cultivation of the cucumber, and that was an old book I had lent me many years since, at a time when I was in full practice in a market-garden, and which did not interest me much. It is a plant I have always been particularly fond of growing, and in the culture of which I had for several years a very extensive practice in the London market-gardens.

The cucumber called the Man of Kent was raised by me, and has been very highly esteemed, as may be seen by referring to the different exhibition reports.

I have seen gardeners attempt to grow cucumbers in October, and lose their plants several times in the course of the winter, not managing to cut a cucumber before May day; but being supplied with plants, first from one neighbour and then the other, from six to ten times. It is easy to guess a gardener's errand about the month of March, if he is seen running about with a small basket or hat-box. I have seen many men who would not commence growing cucumbers until they had either seen or heard of a neighbour beginning, or a thought had struck them from seeing the sun shine; and then they would make a bed in a great hurry, and look round amongst their neighbours for plants.

I have known gardeners put their employers to great and unnecessary expense, and themselves to unnecessary trouble, and after all succeed but indifferently.

I have seen gardeners make a bed of strong hot stable dung, and other fermenting materials, from 3 ft. 6 in. to 5 ft. 6 in. in height; and I believe there are hundreds who follow up the same plan at this very time. Now, if they were only to consider this properly, would they find that the nature of the plant required it? I say, certainly not. Then why continue to follow up such an absurd practice? It appears to me, and always strikes me, when observing the hotbed carried up to such an unreasonable height, that it is either to make it appear conspicuous to every observer, that a cucumber-bed exists in the garden, or that it may be awkward and troublesome for their employers to look into. Why should that be? What need has a gardener to object to his employer looking into a cucumber-frame, when the plants are in a healthy state and doing well, any more than into a hothouse. I have seen those unreasonably high hotbeds lined afterwards strongly with hot fermenting materials, and large holes bored all through the beds, to cause the heat to circulate strongly and rankly through the bottom. A little consideration will quickly show such practice to be entirely against nature. Can it be reasonably thought that they get such a strong fermenting heat at their roots in their natural climate? I should fancy not, and have therefore for many years left off the practice; and I am perfectly convinced, were that old absurd practice entirely dispensed with, cucumbers would be produced with more certainty, in greater abundance, in better perfection, and with much less expense aud trouble. I often wonder how much longer those absurd and unnatural practices are to exist. It would give me great pleasure to see the practical part of cucumber-growing better understood. A man may be in full practice the whole of his life, and yet he may never have once considered whether he was following the system most natural for the production of any one thing under his charge; but go on in some way or other, because he has observed others do the same. A man may read all the books that have been written on any subject; but what is the utility of it if he has had no practice, or has not a mind of his own, properly to reflect on what he is about to do, and what is the most natural method of producing any one thing he is about to aim at? Until that is fully weighed, things will continue in the present unnatural state.

The proper system to cultivate and produce cucumbers all the year round is very simple and easy, and can be summed up in a few words. Get seeds of some good variety, and sow them in charcoal dust if it can be conveniently had, or some rather light, purified, sweet earth, plunging the pot in which they are sown in a kind, wholesome, sweet, heat. As soon as the plants are up, pot them singly into small 60-sized pots, taking care to use wholesome sweet earth, and place them as near the glass as possible. As soon as they have made one rough leaf, and are forming the next, pinch it out, or, more properly speaking, stop it; then shift them into 48-sized pots, leaving one third of the pot not filled with earth, to fill up as the plants advance. When the plants have made another joint, stop them again; then shift them into 24-sized pots; if in the autumn or short days of winter, much time and labour will be saved by so doing; allowing them at this time to grow three joints before stopping them again, and taking care, if they are for the hothouse and to be grown in large pots or tubs, to have some thoroughly sweet earth prepared, brought into the house, and put into what you intend to grow them in, a day or two previous to their being permanently placed where they are to produce fruit, so that the earth may get a little warm. Then train them up a neat wire trellising, or painted string trellis, which I prefer myself, as it is so easily shifted when the plants are to be removed, and a succession to be replaced. It is my rule to stop the plants at every joint after turning them out, as long as they are kept growing, taking care, at all seasons, to have a succession of young plants of different sizes.

The requisites are, nice low pits heated with hot water, well drained, which is most essential on any system; and a good body of well-prepared pulverised soil, consisting of the top spit from an old pasture that is loamy and full of fibre laid together for one year, and, at the time of using, mixed with some sweet, mellow, well-prepared rotten dung, and a little charcoal dust, if it can be procured. For my own practice, I prefer a good frame to any pit for early forcing, except it be a pit on a good construction, worked with hot water, with a nice light trellis to train the plants on, and to keep the fruit from the earth. The depth of the frame, at the back, should be from 2 ft. 6 in. to 3 ft.; the front 6 in. shallower, which is quite sufficient, as the frame can always be elevated to any degree one could wish for, according to the season of the year.

In preparing for the bed, I always take care to have it well drained with faggots, prunings, or some kind of refuse; to have my dung or other fermenting material well prepared and sweetened, and never, at any season of the year, to make my beds more than 2 ft. 6 in. in height (2 ft. is about my measure); and to line the outside immediately with the same material to the very top of the frame, covering the lining all round with a little dry hay or dried short grass, or rubbish of some kind that is stored in summer for that purpose. As soon as the heat rises inside of the frame, get some boiling water, and water the bed regularly all over, which will not only purify it, but destroy every living insect therein; and in a very few days the bed will be ready to receive the soil, which should be well prepared, as stated above. I make it a rule to put a good ridge through the centre of the frame at once, to the depth of 18 or 20 inches, taking care to make use of it in as rough a state as possible. It must be understood that the dung, &c., with which I make my beds is thoroughly worked and sweetened, and such as some people would think of putting on the ground; not depending on any bottom heat from the bed, which, to me, has, for some years, appeared quite unnatural, but relying wholly on the linings for heat. These I find always work very regularly if the dung, &c., is only well mixed before putting to the beds, and then protected well with dry rubbish and feather-edged boards, to keep the wet and winds off. Thatched hurdles, or bundles of evergreen trimmings, placed round the linings, protect them thoroughly. These beds work regularly and kindly for a long time, by occasionally topping up with any dry rubbish; the heat penetrating through the frame similarly to the sun shining on them, and the frames never getting troubled with foul steam, damps, or burning, which the old strong-bed system is always subject to. If the weather proves ever so bad, it is always sweet and kind inside and out of the frame; the plants always dry, healthy, and free from canker and vermin. It is nothing but unnatural usage that produces either: let the weather be rough or smooth, you can always give some air every day, which is most essential to the health and strength of the plants.

My own system is, never to grow but one plant to each light; never to water the plants over-head, but pour plenty of water, a little warmed, out of the spout of the watering-pot, which passes freely through the soil if used in a rough state, occasionally giving them a good soaking of manure-water, and keeping them thin of vine. They will thus continue to produce good fruit in abundance for many months. I take care, when shutting down the lights of an afternoon, to pour some warm water all round the frames, which raises a nice genial steam, and is the means of keeping down wood-lice and other vermin, which delight in drought, foul smells, burned, fusty, bad-worked, fermenting materials.

When I hear a gardener complaining about being overrun with wood-lice, I am perfectly satisfied it is through one of the above causes and want of cleanliness. No man can produce good cucumbers at an early season without some attention.

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Merely keeping his hands in his pockets, or boasting over a pot of ale, will not produce them. I have never yet seen an indolent man that could grow them. With a slight well-worked bed; the linings kind and well attended to; the soil sweet and well prepared, used in as rough a state as possible, and a good body of it for the roots to run in; watered with good soft water, a little warmed; occasionally giving a soaking of manure-water; giving the plants air freely every day; keeping the lights and frames clean; and keeping the degree of heat inside the frame or pit from 65° to 72° in the first part of their growth, and for swelling the fruit kindly from 72° to 80°; you may succeed in getting a good crop of healthy fruit, and very rarely be troubled with any kind of disease or vermin, and never know what it is to have a burned, fusty, unkind bed, which is the parent of disease and vermin.

Bicton Gardens, January 16. 1843.

Art. II. *Ground Plan and Perspective Elevation of a Portion of improved Landscape Scenery, intended to point out the Errors which are frequently committed by Persons who have little Knowledge of Landscape Composition.* By Samuel Gray, Esq., Landscape-Gardener and Garden Architect.

Fig. 126. is a ground plan of a scene which has been improved, and the following are its details: —

a, A large tree, which, being a prominent feature in the grounds, the principal walk is made to approach it.

b, A boundary fence, with trees planted at regular parallel distances.

c, An iron fence to divide the paddock from the garden.

d, A piece of water.

e e e e, Pedestals with vases.

f, A fountain.

g, A summer-house upon the high ground.

h, A sundial in the centre of the lawn.

i, A pigeon-house opposite the end of a walk.

k, A garden-seat, placed near an open space between the shrubs, for the convenience of viewing the prospect; where the children of the family frequently feed their favourite cow or ass, which consequently keeps upon the spot when any one is near the seat.

l, A rustic basket in the centre of a flower-bed.

m m, A seat at each end of the lawn.

n, A macaw and stand.

o, Cow-house, &c.

p p p p p, Various flower-borders.

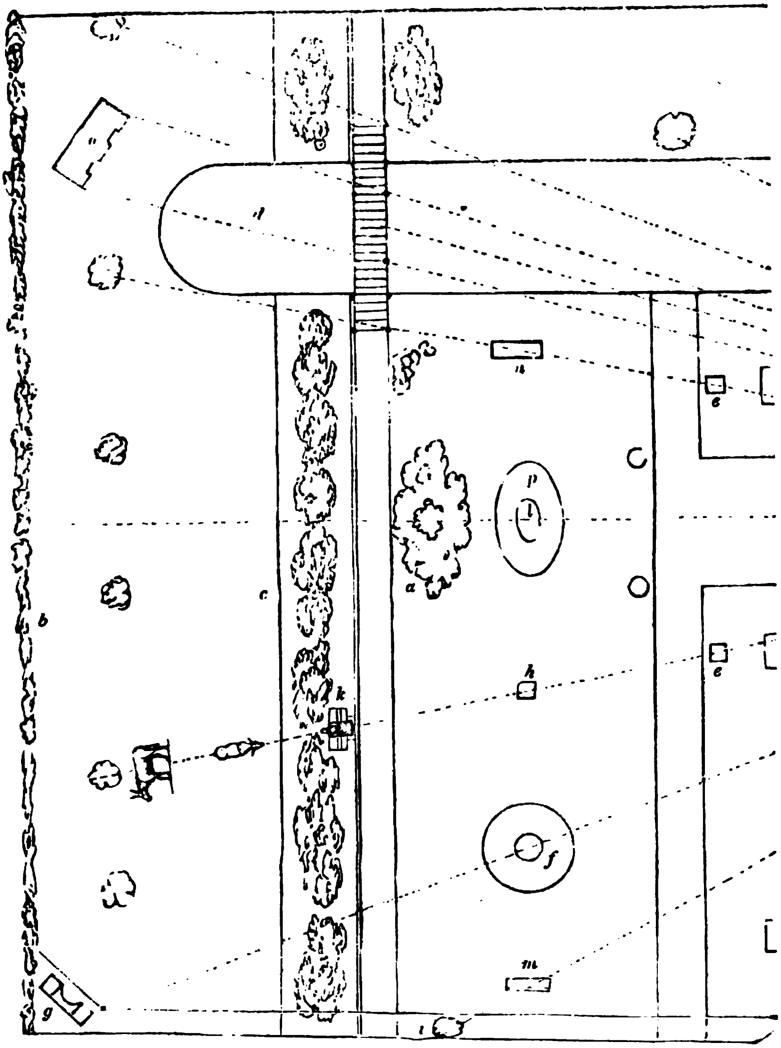
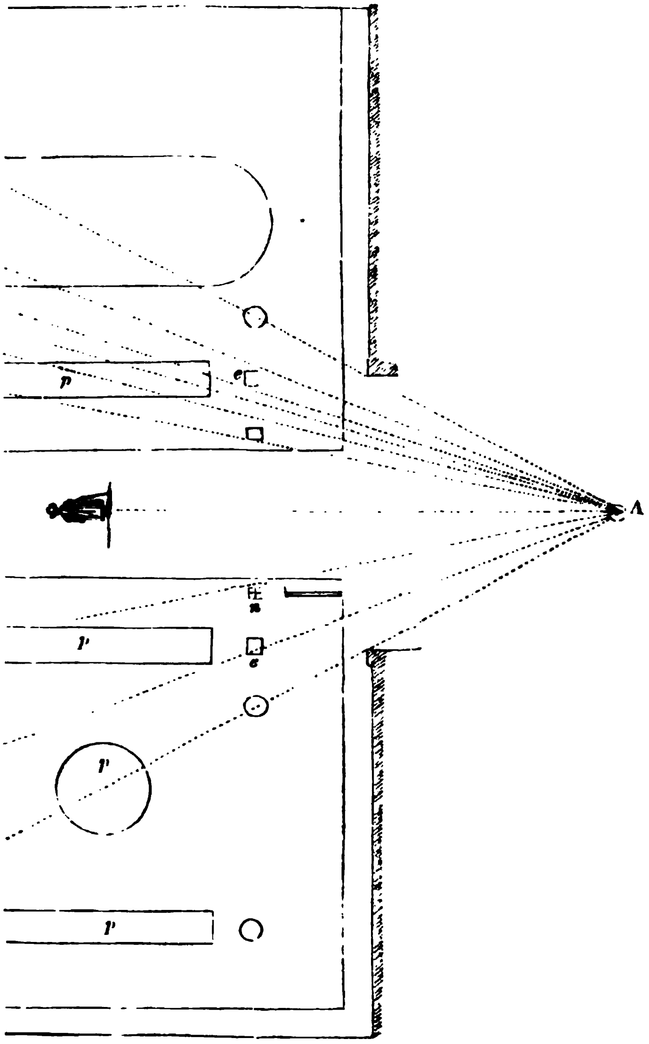


Fig. 126. *Ground Plan of a Garden, for the Purpose of illustrating*

Fig. 127. is a view taken from the point A, in which the objects composing it are placed in very ludicrous positions one over another. For example, the lady in the central walk appears to support on her head a circular bed of flowers, with a rustic basket containing flowers and a forest tree. The lady seated in the garden-chair a little to the left, and in the fore-



n its Elevation certain Errors in Landscape Composition.

ground supports, first a pedestal and vase, next a lady, chair, cow, and tree; and so on with the rest.

To the eye of taste, this arrangement of scenery is quite as offensive as discord is to the ear of a musician. The best way of detecting similar errors is by reflecting the landscape from the principal points of view in a small convex mirror; by which

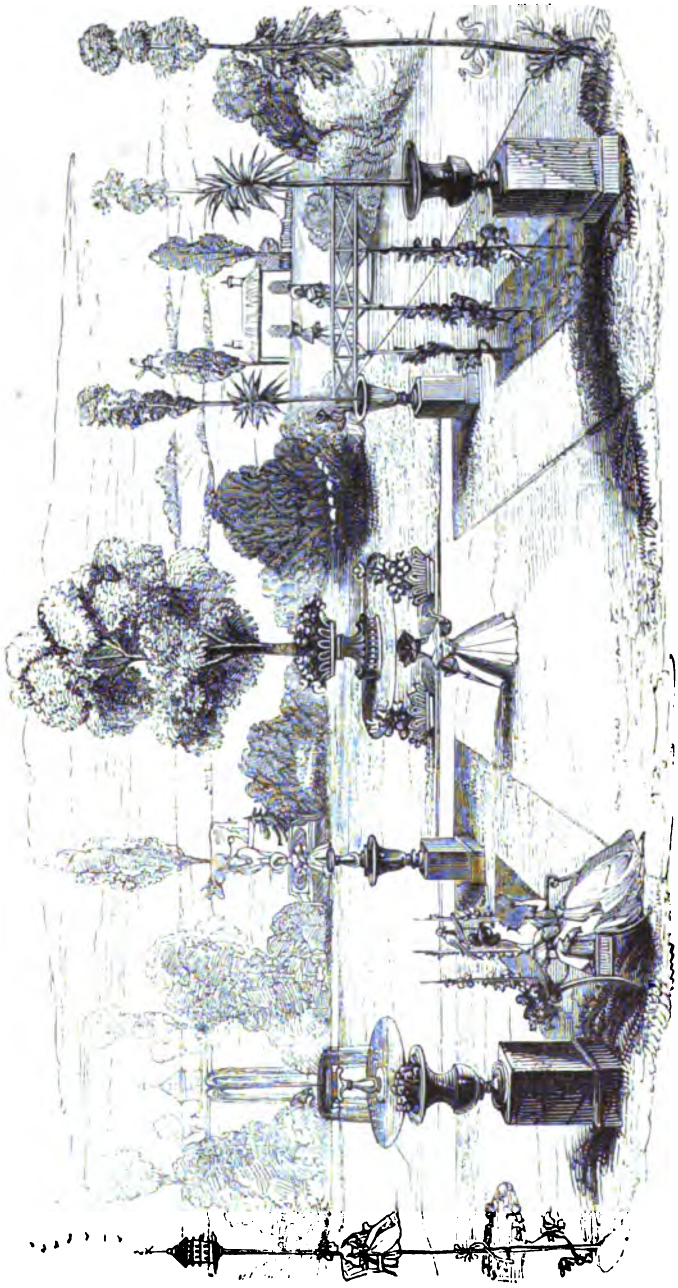
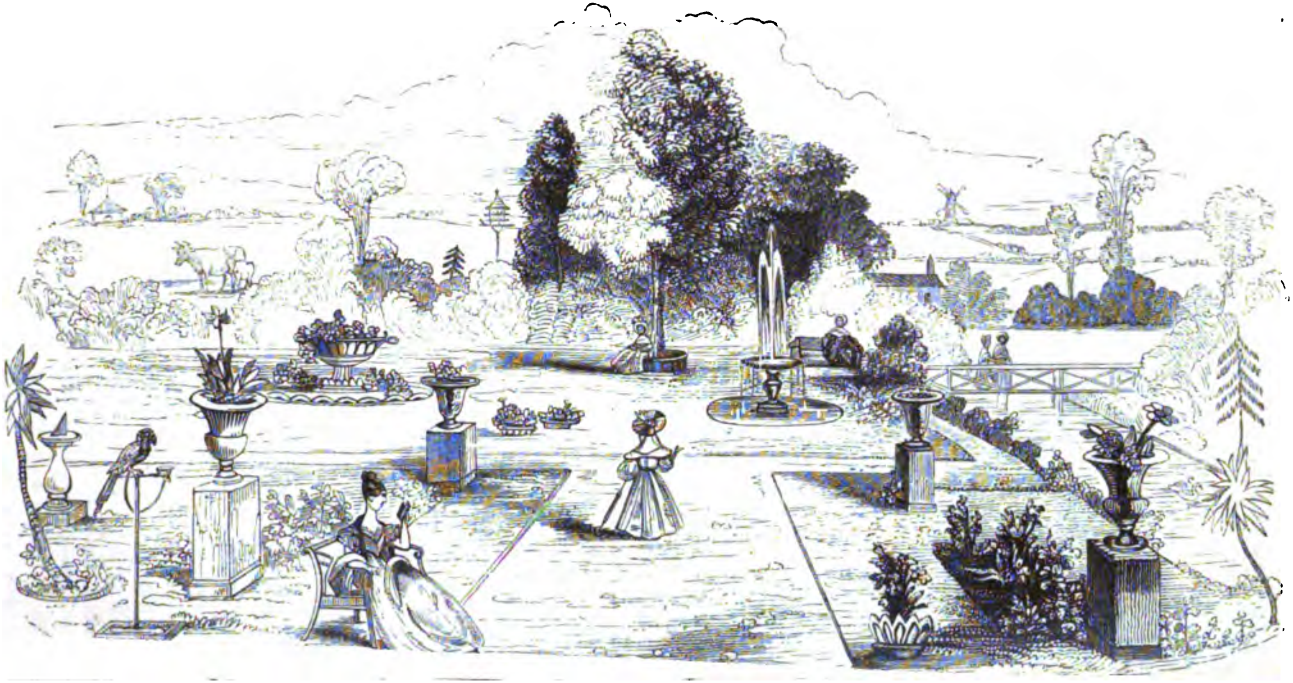


Fig. 127. *The Perspective Elevation of fig. 126., as seen from a Point of Sight (A. in fig. 126.) too high*



of a Portion of improved Landscape Scenery.

means it will be brought within the compass of the eye, seen as a painted landscape in a frame, and any errors in its composition detected.

Fig. 128. shows the same landscape viewed from a lower point of sight, in which every object takes its proper place.

In laying out a piece of ground with a view to produce the best effect, care should be taken to bring forward all the most prominent objects with a background by no means complex, but produced either by objects in shadow or by broad and flat masses of foliage. Small parts, such as stems of trees, or any objects producing sharp or straight lines, always confuse and cut into the form of the design.

5. Brecknock Crescent, Camden New Town, 1840.

Art. III. *Phrenology for Gardeners and their Patrons.* By Thomas Jones.

I entirely agree with you (p. 552.) "that young gardeners ought to be phrenologists to a certain extent," to assist them in estimating the character of one another, as well as of those they have to deal with. I have, therefore, drawn up for you a short article on the subject, which I have illustrated with engravings; and, as I have had these made at my own expense, I hope you will find room for the article in your December Number, though I admit that it is not altogether suited to a *Gardener's Magazine.* You have very wisely stated (Vol. III. p. 432.) that it is by bringing other arts and sciences to bear upon the art or science which we wish to cultivate, that the greatest progress is to be made; allow me therefore to recommend phrenology to gardeners, as a science that will aid them in their choice of apprentices, journeymen, and labourers; and to masters, as an assistance in the choice of gardeners. The science of phrenology is neither more nor less than doing that from the knowledge of certain principles which we all do involuntarily; that is, form an opinion of every individual at first sight, from his personal appearance. For the principles of this science, I must refer you to the works of Mr. Combe, and to the *Phrenological Journal;* and, to give you confidence in my opinion, that it is destined, at no distant period, to effect most important changes in the system of education, and in the choice of all servants, whether public or private, and let me add, also in the choice of husbands or wives, and friends, I will refer you to the progress this science is making throughout Europe, and especially in Germany. I shall commence by recommending gardeners to endeavour to ascertain the defects of their own temperaments and organic conformation. Having arrived at this knowledge, they will be enabled, to a

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certain extent, to guard against the errors to which, by their particular variety of constitution, they are destined to be the most prone. When blamed for anything by their masters, they will be the more likely to acknowledge their error and amend, when they find that the fault was one which, from their constitutional tendency, they were very likely to commit; therefore, not only teach them how to choose workmen of different kinds, but how to manage them. Men and women of no education, or without that substitute for it, the cultivation which is given by constant intercourse with educated people, must necessarily be the slaves of their temperament; and, therefore, a head gardener may tell pretty nearly what he has to expect from a garden labourer as soon as he sees him. He will foresee his faults and virtues, and shape his treatment to him accordingly.

Gardeners out of place are not likely often to have a choice of situations and of masters; but sometimes they have; and it must be useful to them to know that, all other circumstances, such as duty, wages, prospects, &c., alike, the lord, or the lady, with a broad full chest, broad erect forehead, and not much exceeding the middle size (*fig.* 129.), will naturally be the most kind and generous to them, provided the servant does his duty. In such a case as I am contemplating, an intelligent gardener would not willingly choose to live with a master having narrow shoulders and a contracted chest (*fig.* 130.), or a defective facial angle (*fig.* 131.) instead of the angle of intelligence (*fig.* 132.), though the inestimable blessing of education, and the intercourse of high and polished society, neutralise or counteract the former to such a degree as to put its possessor almost on a footing with the man of native strength of mind.

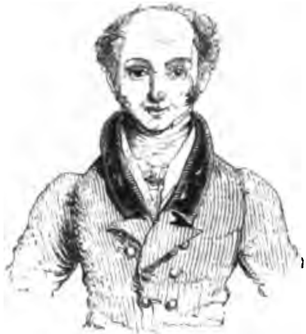

Fig. 129. *Broad Chest, and broad Forehead.*

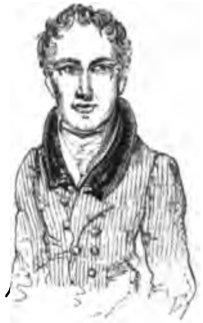

Fig. 130. *Narrow and contracted Chest, and narrow Forehead.*

But if this kind of knowledge is of importance to a gardener in the choice of an employer or of labourers, it is of still greater importance to him in the choice of a wife. Nothing good is to be expected from an uneducated woman, unless she has an ample chest and attenuated extremities. It is true, personal attraction is but a small item of what makes up the sum of happiness, either in the married or the single state; but there can hardly

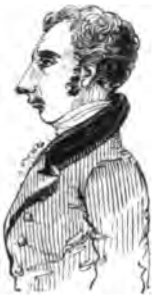

Fig. 131. *Defective Facial Angle.*

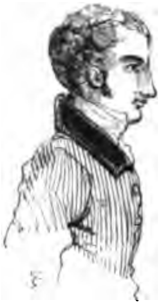

Fig. 132. *Angle of Intelligence.*

be such a thing as happiness without health, or good health without an ample chest. Handsome extremities are indications of native gentility, and are not found often connected with mal-formation in other respects. All other things being equal, a man should make choice of a wife whose form and extremities come as near as possible to those of the Venus de Medicis (*fig.* 133.); and a woman should choose a husband of a form, and with extremities, coming as near as possible to those of the Apollo Belvedere (*fig.* 134.). Full-sized statues of these models of beauty and perfection ought to be in every garden, and in the hall of every gentleman's house; and casts of them (which may be had very perfect of their kind at 7*s.* each) on the chimney-piece of every cottage, as a *beau idéal* to operate on the imagination on the principle of the peeled rods of Jacob.*

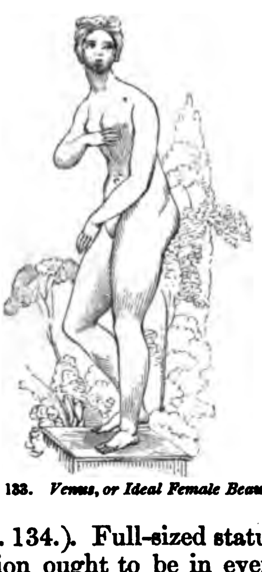

Fig. 133. *Venus, or Ideal Female Beauty.*

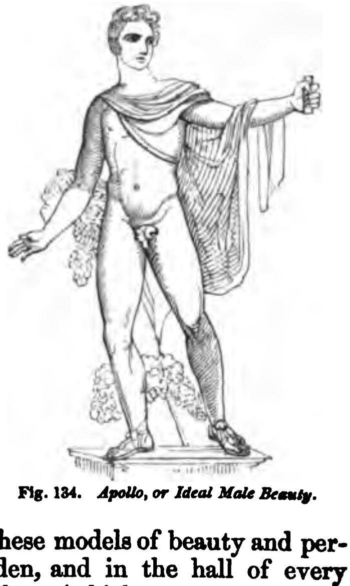

Fig. 134. *Apollo, or Ideal Male Beauty.*

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* *Long-continued wars* tend to degenerate the human race, by laying hold of the tallest men, and those possessed of the most robust health, and sweeping them off without their leaving offspring. It would be much better for the human race to select for soldiers none but little men; or to admit all capable men, and, when the capacity was equal, to take little men in preference. (*Annales de la Hygiène Publique*, as quoted in *For. Quart. Rev.*)

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I hope it will not be thought from anything that I have advanced in this speculation, that I make light of everything that is not perfect beauty or vigorous mind; far otherwise. The great object of human life is happiness; and, provided an individual has tolerable health and sustenance, happiness is always within his power, whatever may be his temperament or configuration. Happiness lies in health and in the power of the mind to accommodate itself to the circumstances in which it may be placed; in two words, health and contentment. Every body has these words in his mouth; but, to turn them to account, it is necessary to cultivate the conditions of being which they indicate; to preserve and strengthen health, and to reason with ambitious, envious, and covetous feelings. The nice point is, to know how far to bend our wishes to our circumstances, and how far to endeavour to raise our circumstances to our desires.

London, Nov. 1843.

Art. IV. *Some Account of the principal Cemeteries in the United States, particularly those in the Neighbourhood of Philadelphia.* By James Mease, Esq., M.D.

There are several graveyards or cemeteries in the vicinity of Philadelphia, and all but one are formed upon the principle of joint stock companies. The first was laid out by the late James Ronaldson, a Scotchman, sixteen years since, and is now the property of his brother Richard. It is a short distance beyond the south bounds of the city proper, and is divided into 900 lots, each 8 ft. by 10 ft. A number of evergreen and other trees are planted in the enclosure, which is surrounded by a brick wall about 5 ft. high, and surmounted by an iron railing. 7000 bodies have already been interred in it. The price of a single grave is only 6 dollars. The superintendant resides on the spot. It is a beautiful place.

2. *Laurel Hill* is 3½ miles north of the city, on the river Schuylkill. The part devoted to interments embraces about twenty acres, and is laid out in the most tasteful manner. The entrance is a specimen of Doric architecture, through which is a pleasing vista, and on each side are lodges for the accommodation of the gravedigger and gardener; and within is a neat cottage for the superintendant, a Gothic chapel for funeral service, a large dwellinghouse for visitors, a handsome receiving tomb, stabling for forty carriages, and a greenhouse. Besides the native forest trees on the place, several hundreds more, and many ornamental shrubs, have been planted. The lots are enclosed by iron railings. There have been 767 interments in six

years. The beauty of the establishment renders it deservedly popular. Price of a lot 8 ft. by 10 ft. 66 dollars. Recently attempts have been successfully made to plant every tree which will bear the climate, both foreign and domestic; in short, to convert the place into an arboretum. The cost of it was 100,000 dollars; and the success of the establishment may be ascribed to its beauty, perfection, excellent management, and admirable regulations.

3. *Monument Cemetery* consists of 12 acres, and is situated in Broad Street, continued a short distance beyond the north line of the city proper. Number of lot-holders 4361. A Gothic chapel has been erected, with a handsome spire 100 ft. high, and a house for the superintendant.

4. *Philanthropic.* — 3 acres 36 perches are divided into 792 lots; a part is set off for strangers, for whom 4½ dollars form the burial charge; the lots of the stockholders are 8 ft. by 10 ft.

5. *Union.* — About 350 ft. long, by 200 ft. deep.

6. *Lafayette.* — About 340 ft. each way; 1400 lots, each 8 ft. by 10 ft., making four graves in each lot.

7. *Machpelah.* — 368 ft. by 147 ft., lots 8 ft. by 10 ft., and sell from 40 to 50 dollars each. These last four cemeteries are south of the city bounds, and are enclosed by an iron railing set either in granite or in brick. The superintendants reside on the ground, in neat brick houses.

8. The *Woodlands* on the west side of the Schuylkill, in sight of the city, late the elegant seat of William Hamilton, deceased, an ardent cultivater of botany. The road to the mansion is through a grove of native forest trees, and the view extensive. Seventy-five of 91 acres are to be devoted to a cemetery. No interments have yet been made.

9. *Green Mount Cemetery*, near Baltimore, Maryland, formerly the seat of the late Robert Oliver. Sixty acres, including the mansion, have been laid out for the purpose, and divided into 6000 lots, each 16 ft. by 20 ft. It is surrounded by a wall, with a magnificent gateway.

10. A very handsome one has been laid out at *Brooklyn*, Long Island, opposite to New York, on the east river. 11. Another at *Salem*, Massachusetts, 14 miles north-east of Boston; and one (12.) at *Worcester*, in the same state, 40 miles west of Boston, have recently been laid out.

13. *Mount Auburn*, 4 miles from Boston, was purchased in 1830, and the association incorporated the following year. The tract consists of 118 acres, and the total cost of grounds and improvements to 1838 was 34,197 dollars. The woodland is covered by forest trees of large size and various kinds; and

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the tract is beautifully undulating, and contains a number of eminences and shady valleys. The principal eminence, called Mount Auburn, is 125 ft. above the level of Charles River, near a fine sweep of which the tract is. This romantic and picturesque cemetery is the fashionable place of interment with the people of Boston. Spurzheim, who died there Nov. 10. 1832, aged 56 years, greatly lamented, was buried in it. The tomb is an elegant, but plain, oblong sarcophagus, erected by subscription, and bearing no other inscription than his name. I saw it in March, 1834.

Philadelphia, May 11. 1843.

ART. V. *On Laying out and Planting the Lawn, Shrubbery, and Flower-Garden.* By the CONDUCTOR.

(*Continued from* p. 635.)

THE design, *fig.* 135. is taken, with some variations, from an old book by Andrew Mollett, or Mallet, a relation and contemporary of Claud Mollett, who was gardener to Henry IV. and Louis XIII. of France, as Andrew is said to have been to James I. of England. His title, in that capacity, was Superintendant-General of the Gardens of the King of England.

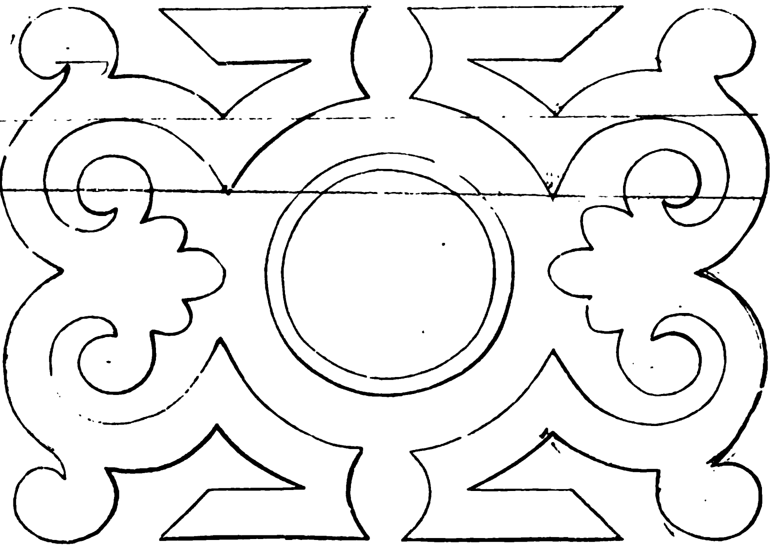

Fig. 135. *Flower-Garden about the Middle of the Seventeenth Century.*

His book contains a number of designs, some of which are not badly composed, and we have selected that before us, and two or three others to be given in our next volume, as specimens of the style of flower-gardens prevalent both in France and England about the middle of the seventeenth century. There were, at the same time, flower-gardens of embroidery, as appears by the work of Boyceau, Superintendant of the Gardens of Louis XIII., published in 1638.

The figure before us may either be cut out of turf, or the beds edged with box, and the paths, which are supposed to be 3 ft. wide, graveled. The central circle ought to be a basin of water, with a white water-lily in its centre, spreading out its broad leaves to give shade to an abundant supply of gold-fish. The herbaceous plants must be a miscellaneous assemblage; and there may be, in addition, low plants of variegated box or variegated yew, clipped into the form of cones, in the roundish projections at the angles. In the centre of the two rosettes there may be a pyramid of juniper, 1 ft. on the side at the base, and not above 4 ft. high; and very small plants of variegated *C*uprėssus *t*hyöìdes may be planted in the centre of the two side roundish projections, and clipped into the form of small globes.

This was the ancient style of planting such gardens. For the modern manner we refer to Mr. Ayres.

(*To be continued.*)

ART. VI. *Arboricultural Notices.*

The Hatfield Oak (*Arb. Brit.*, vol. iii. p. 1759. fig. 1593.) is universally called the Dool Oak [and hence it is supposed that in former times it was used as the baronial gallows], and from its great age it has no doubt a right to the name. — *George Chapman.* 3. *Arundel Street, Strand, Feb.* 21. 1843.

Uses of the Larch. — " We chose a healthy young larch tree, peeled off the outer bark, and then cut the soft inner bark into small pieces, which we boiled, until the surface of the water in the kettle became covered with a resinous scum, which was carefully removed. The broth was then seasoned with salt and pepper, and, in spite of the remaining particles of turpentine, it tasted well and filled the stomach. We took it in moderation, and felt no ill effects from it, &c.

" It is a great comfort to know, that, though the corn laws may remain, we can defy the monopoly of the landlords, by having larch soup, and our peck loaves made, as Humboldt advises us, of good fresh sawdust. When the earth is a little more densely inhabited, as in the space of another century or two, men will use trees, not only for shade in summer, and fuel in winter, but for food all the year round. It is some comfort to know that as long as trees exist man cannot perish by famine ; and, when he has eaten what is on his platter, he may finish safely and pleasantly by eating the platter itself, ' patulis nec parcere quadris.' " (*Von Wrangell's Expedition to the Polar Sea*, as reviewed in *Gent. Mag.* vol. xviii. p. 500.)

Growth of Trees. — A plantation made in 1765, partly on swampy meadow

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n a gravelly soil, was examined twenty-one years afterwards, viz. in 1786, and he circumference of some of the best trees taken at 5 ft. above the ground. The small firs had been occasionally drawn for posts and rails; and also as afters for cottages; for which purpose, when peeled of the bark, they will ast for seven years.

	Height.		Circumf. at 5 ft.	
	ft.	ft.	ft.	in.
Lombardy poplar (cuttings) - -	60	to 80	4	8
Abele - - - - -	50	to 70	4	6
Plane - - - - -	50	to 60	3	6
Acacia - - - -	50	to 60	2	4
Elm - - - - -	40	to 60	3	6
Chestnut - - - -	30	to 50	2	9
Weymouth pines - - -	30	to 50	2	5
Cluster ditto - - - -	30	to 50	2	10
Scotch fir - - - -	30	to 40	3	3
Spruce ditto - - - -	30	to 50	2	2
Larch - - - - -	50	to 60	3	10

— (*Young's Annals of Agriculture*, vol. vi. p. 89.)

American Trees introduced in 1769. — In the years 1769, 1770, and 1771, I subscribed to a society then established at Edinburgh, for importing seeds of forest trees from Canada. I received a large quantity of seeds, which came up very well; and are now growing in my plantations, in a very flourishing condition. The sorts are, the great white spruce, which, I believe, is what the nurserymen call the Newfoundland spruce; 2d, the American black spruce; 3d, the balsam fir, which is the most hardy kind, and flourishes in the most exposed situations; 4th, the great black larix; 5th, the grey ash; 6th, the red mespilus, which bore fruit three years ago; 7th, the great white mespilus; 8th, the great black birch; 9th, hickory walnuts; 10th, black walnuts. (*W. M. Beverley, of Cleveland, Yorkshire, May* 25. 1786, in *Annals of Agriculture*, vol. vi. p. 355.)

Growth of Trees at Barton, near Bury St. Edmunds. — Amongst the young trees at this place are some which seem worthy of notice. In none of the books of reference do we find the rapid growth of *A*'bies Douglàs*ii* noted as having been at all equal to what has been witnessed here. Sir Henry Bunbury received from the Horticultural Society a little plant, in a pot, in March, 1830; in the spring of 1831 it was planted out. It is now, as nearly as can be ascertained, 35 ft. high; the spread of its branches 13 ft., and the girt of its stem, at 1½ ft. from the ground, 30 in. This summer, for the first time, this beautiful tree is bearing cones. Next to the Douglàs*ii*, *P*ìnus Coúlteri has been the most rapid in its growth. But a young *P.* insígnis is now growing at a prodigious rate. One of the finest trees here is a Magnòl*ia* acuminàta, which was planted in August, 1825. It is about 35½ ft. high, feathering to the ground on every side. The girt of its stem, at 1 ft., is 28 in.; at 4 ft., 24 in.; at 5½ ft., 23 in. A Magnòl*ia* auriculàta, planted in Nov. 1823, is about 24½ ft. high. Some persons in the neighbourhood complain that their Levant oaks (grown in a sandy soil) *canker* after twenty years. There are no such symptoms in those growing on clay, which are in the greatest vigour and beauty. Possibly in the former cases the roots have got down to hard chalk. (*Gard. Chron.* for 1843, p. 647.)

Clématis Vitálba, the common hedge clematis, in the garden of the rectory-house at Shenley, Herts, has two stems, each of which is as thick as the calf of a man's leg. It runs up a fir tree to the height of about 50 or 60 feet, although I suppose it is not more than twenty-five years old. — *T. N. Shenley, Sept.* 4. 1843.

Duvaúa longifòlia Lindl.; *Anacardiàceæ.* — This species, which, like the others, is an evergreen, differs from D. depéndens in its leaves not being at all serrated, and decidedly narrowed, not widened, to the base; and also in having very short corymbs of flowers. It is much hardier than any of the others, having stood against an exposed wall in the hard winter of 1837–8, when all the others were either killed down to the ground or entirely destroyed. It grows freely in any good garden soil; flowers in June or July; and is increased by seeds, or by cuttings of the half-ripe wood, taken off about August, and treated in the ordinary way. (*Bot. Reg.*, Nov. 1843.)

Lonícera diversifòlia Wall. Cat. No. 477.; *Caprifoliàceæ.* — A hardy shrub, raised in the garden of the Horticultural Society from East India seeds. It is in the way of Lonícera Xylósteum, the common fly honeysuckle, and has bright yellow sessile flowers, appearing in June. (*Bot. Reg.*, Nov. 1843, Misc.)

ART. VII. *On the Rotation of Crops in Kitchen-Gardens.* By ROBERT ERRINGTON.

MR. BARNES has said, of late, some excellent things about kitchen-garden cropping; he has practised, it seems, in that best of all schools, a London market-garden. As he has, however, not dwelt much on the general rotation of crops, I beg to offer a few remarks on that head, and to detail my general practice; premising, in the first place, that the gardens of which I have the charge are a sandy loam of 26 in. on a substratum of dry red sand.

These are the days for economising manures. It is well it should be so; but, like all other public fits, it has a tendency to rush to extremes. I must, however, declare my conviction, that all the lawn-sweepings and gas water from London to John o' Groat's will never produce the cauliflowers, asparagus, celery, lettuce, &c., for which rotten muck has been so long famous. There is an old saying, "no argument like a breeches-pocket argument;" and, through this circumstance, writings on this head frequently carry more weight than they are entitled to.

One of the great secrets in working old kitchen-gardens is, to prevent, as much as possible, the *B*rássica tribes from following each other. I feel well assured that the digging in of the residue continually of the rotten remains of cabbages, cauliflowers, &c., has a tendency to lead to the disease called club. Raspberries and strawberries which have stood, it may be, years on the same ground offer, when broken up, an excellent opportunity for any of the brassicas; in fact, one not to be lost. Another difficulty arises in getting proper plots for onions and carrots, as, in the great majority of old gardens, they are so liable to the grub. For my part, I have invariably found, by many years' experience, that the more ground is manured for the two latter crops, the more liable they are to the grub. Old asparagus beds are another excellent resource to fall back on; but there are generally so many candidates for ground of this kind, that the difficulty is to choose. In gardens liable to club, however, brassicas should, in my opinion, have the preference by all means. My practice, for years, has been to follow, on the principal of my broccoli or other brassica ground, with peas; no manure. The peas I follow with celery chiefly, which I grow in what is termed the Scotch way, viz., 5- or 6-feet beds. Now, by sowing two rows of peas at a time, I gain thereby, when the peas are drawn, a celery bed; and the celery being pricked out at a good distance, say nearly 6 in. apart, is prepared to await the removal of the peas successively. As to celery, I sow it late, and grow it quick: this is the true recipe for having tender and crisp celery. The celery ground is, of course, in a state of high preparation for any crop that requires rich soil, such as cauliflowers, broccoli, asparagus, &c.

With regard to asparagus, I make it a rule to break up a bed or beds every year, and to plant an equal quantity: this I plant on the celery ground, and the beds I intend for asparagus I dig and manure very deep; putting old half-rotten leaves in the bottom, and planting the celery in the old manure at top. When the celery is removed this ground is in excellent order for asparagus, which I plant in the beginning of May, when the asparagus is 6 in. high. Now the beds being about 6 ft. wide, I plant two rows in a bed, 30 in. between the rows, and the plants a foot apart; leaving a shoulder of 18 in. on each side the bed: this plan answers admirably. The old beds of asparagus which are broken up are forced in the autumn, and generally obtained by Christmas; and I have strong plants planted in rows a yard apart, of three years' standing, which I take up and force in succession. These last are grown in a peculiar way, expressly for forcing. I have a deal to say about asparagus, but I must reserve it for a future opportunity. To return to the remainder of the celery ground: I crop it chiefly with beans and broccoli, putting the broad beans in rows 4 ft. apart, in successive plantings; and drawing drills and planting my broccoli, in the course of July, between the beans. This, be it understood, is all late spring broccoli, including some middle season, as Granger's, Knight's protecting, &c. My Cape and other autumn broccoli and cauliflowers are in another plot, constituting a different rotation. The beans form an excellent shade for a while to the broccoli, and, when they are pulled up, the bean soil is earthed up the broccoli stems; and, if the broccoli is not too large, a row of coleworts is planted in September between each two rows of broccoli.

The broccoli ground, in April, is followed in part by carrots, without manure, and perhaps parsneps, or beet.

Potatoes I have not named, as they deserve a separate notice. I will, however, observe that potatoes, with a slight coat of manure, form the best preparation of any thing I know for the brassicas, or, in fact, for any crop whatever.

I ought to have said that I run rope-yarn and stakes round all my prime asparagus, as much fine asparagus is injured by the winds in the growing season, rocked about, and broken; the consequence of which is, that the fine large buds are pushed prematurely in the summer season, and twenty small heads take their place.

I have a mode of cultivating all my fruit-tree borders, without ever digging above 6 in. deep; but this I mean to say something about at a future period.

Oulton Park, near Tarporley, Cheshire, Oct. 2. 1843.

Art. VIII. *The History of the Introduction of the Swedish Turnip into Britain.* By the Rev. Thomas Newcome, Rector of Shenley, Hertfordshire.

Our common friend, the Rev. J. Mitford, has recommended me to communicate to you what I consider to be the true history of the introduction of that valuable plant the Swedish turnip into this island.

It is now about fifty years since the late Sir David Kinloch of Gilmerton, near Edinburgh, gave some of the seed to my father, the Rev. Henry Newcome, Vicar of Gresford, Denbighshire, and a near neighbour to Sir Forster Canliffe of Acton Park, near Wrexham; who married a daughter of Sir David Kinloch. This latter baronet told my father that "a Swedish nobleman had given the seed to him." I well remember my father growing about half or three quarters of an acre of the seed, and selling it to the late Mr. Mason of Fleet Street, an eminent seedsman, for, I believe, the sum of 70*l.*; and this was the first seed sold in London.

Now, if you know a more authentic account of the introduction of the Swede turnip, you will, of course, not take any notice of, nor publish, this my account of the matter; but, though writing from mere impression and memory, I believe this is substantially the true one.

I have often heard my father declare that "he was the first to teach the people in North Wales to hoe their turnips;" and that he astonished the natives by ploughing up old furze, or gorse, roots with a Hertfordshire wheeled plough, imported from this parish to that of Gresford, near Chester. He was the first who ploughed in that county with two horses abreast; while, at that day, all the farmers ploughed their light gravelly soil with four horses at length!

Shenley, Herts, Sept. 4. 1843.

REVIEWS.

ART. I. *Literary Notice.*

THE following address has been printed, and sent to a number of persons, who, it is hoped, will kindly endeavour to promote the object in view.

" *The Arboretum et Fruticetum Britannicum*, in 8 vols. 8vo, 4 of letterpress and four of plates. Price 10*l*. With upwards of 2000 woodcuts interspersed with the letterpress.

N.B. The plates, if required, will be sold by themselves, but the letterpress will not be sold without the plates. The reason is, that any number of impressions may be taken from the plates whenever they are wanted; whereas the letterpress, not being stereotyped, there are of it but a limited number of copies, which cannot be increased.

The plates by themselves will be of great use to landscape artists, to the pupils in schools of design, and to all persons learning to draw trees.

A new impression of the four volumes of the plates of this work being about to be issued, with certain corrections which in the original edition could only be put in the list of errata, the author, with the approbation of his publishers and friends, thinks it may contribute to the sale of the work to make the following statement.

The *Arboretum Britannicum* was got up between the years 1833 and 1838, and published on Mr. Loudon's own account at an expense of upwards of 10,000*l.* The greater part of this sum was owing at the completion of the work; but it sold so well, till the late depression of the book trade in 1841, that only about 2,600*l.* of the debt remained to be paid off at the end of that year. It is, however, necessary to observe, that this large proportion of the debt was not paid off solely by the produce of the *Arboretum*, but in part by the profits of Mr. Loudon's other literary property, consisting of thirteen different publications, all of which stand pledged in the hands of his publishers, Messrs. Longman, for the debt on the *Arboretum*. This debt, at the present time, amounts to about 2,400*l.*; and hence, if 350 additional subscribers could be got, the debt would be at once liquidated, the works pledged for it set free, and Mr. Loudon or his family would enjoy the whole produce of his literary property.*

This appeal would never have been made, had not Mr. Loudon, who has been an invalid for several years, been lately seized with an inflammation of the lungs, terminating in chronic bronchitis, which, even if the disease should be considerably alleviated, will effectually prevent him from any longer pursuing his profession of landscape-gardener, on the produce of which profession, and on the literary labours of Mrs. Loudon, he has entirely depended for his income, since his literary property was pledged for the *Arboretum.* Under these circumstances Mr. Loudon feels himself justified in taking this mode of soliciting additional subscribers to the *Arboretum,* and in begging his friends and patrons throughout the country to assist him in obtaining them.

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* It may be thought, from the well-known extensive sale, for the last twenty years, of Mr. Loudon's publications, that he ought now to be independent; but, in consequence of too intense application while compiling the *Encyclopædia of Gardening*, Mr. Loudon fell into ill health in 1821, which obliged him ultimately to have his right arm amputated, his left hand being at the same time so much injured as to leave him with only the partial use of two fingers, and his left knee being anchylosed. In consequence of these bodily infirmities, Mr. Loudon has been obliged to keep an amanuensis and a draughtsman for the last twenty years, and also a servant to act as valet; and, had it not been for the expenses thus incurred, and others arising from the same source, he might have been now independent, even without his literary property. This explanation is due to those who are ignorant of Mr. Loudon's personal character.

The *Arboretum* has been spoken of in the highest terms in all the principal Reviews of Europe, and in the Botanical Periodicals of North America. The *Quarterly Review* says: —

'This book is one of solid value, worthy of a place in the library of every landed gentleman, as well as of every student of botanical, arboricultural, and horticultural science. . . . Let us warmly congratulate Mr. Loudon on having finished his Herculean task; a task which few men, except himself, would have had the courage to begin, and still fewer the perseverance to complete. The *Arboretum Britannicum* is complete in its kind, and it must become a standard book of reference on all subjects connected with trees.'— Oct. 1838.

If, then, the *Arboretum* is 'worthy of a place in the library of every landed gentleman,' it may be permitted to its author, under his particular circumstances, to direct the attention of landed gentlemen to the book. Surely there must be more than 350 hereditary libraries that do not yet contain the work; not to mention the libraries which some gentlemen devote to their gardeners, foresters, and bailiffs, in which the *Arboretum* will be found a most useful acquisition.

The following ladies, noblemen, and gentlemen, who already possess the work, on being applied to, have kindly permitted their names to be published as approving of the *Arboretum,* and of this address to the public: —

The Right Honourable Lady Rolle.
Mrs. Lawrence of Studley Royal.
The Duke of Northumberland.
The Duke of Devonshire.
The Duke of Buccleuch.
The Duke of Sutherland.
The Marquess of Northampton.
The Earl of Shrewsbury.
The Earl of Aberdeen.
The Earl of Harrington.
The Earl Fitzwilliam.
The Earl of Radnor.
The Earl of Ripon.
The Earl of Lovelace.
Viscount Combermere.
The Bishop of Winchester.
Lord Monteagle.
Lord Corehouse.
Sir John Trevelyan.
Sir H. E. Bunbury.
Sir Charles Lemon.
Sir Oswald Mosley.
Sir William Jardine.
Sir W. J. Hooker.
The Rev. J. Mitford.
The Rev. M. J. Berkeley.
The Rev. W. T. Bree.
Captain Widdrington, R.N.
J. T. Brooks, Esq., Flitwick House.
Joseph Strutt, Esq., Derby.
L. W. Dillwyn, Esq., Sketty Hall.
Gregory Gregory, Esq., Harlaxton Manor.
P. J. Selby, Esq., Twizell House.
Professor Henslow.
Professor Lindley.
Professor Royle.
Dr. Neill."

Some of the above noblemen and gentlemen have, unasked, kindly sent us testimonials evincing their very favourable opinion of the *Arboretum,* and these we shall probably publish in our next Number.

We have also received some additional subscribers, among whom are Joseph Strutt, Esq., of Derby, for ten copies, and Mrs. Lawrence of Studley Royal, one copy. Mr. Strutt took a still greater number of copies when the work was first published.

THE

GARDENER'S MAGAZINE,

AND REGISTER OF RURAL & DOMESTIC IMPROVEMENT.
GARDENING And GARDENERS
FOR
1843.

CONDUCTED

By J. C. LOUDON, F.L.S. H.S. &c.

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AND VILLA ARCHITECTURE, AND OF THE ARBORETUM BRITANNICUM AND
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MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Distribution of Sea Water all over the Country.—This will be practicable by means of the railroads, which, in a short time, will cover the whole country with a sort of network of communication, radiating from the large towns in the interior to the different seaports. As the direction of these roads is straighter, and their surface nearer a level, than those of the common roads, pipes might be laid down, at a proper depth under the rails, and sea water, by the occasional aid of sea engines, conveyed everywhere, and supplied by service-pipes all along the roads. We believe the Brighton railroad has one uniform slope, from a short distance from Brighton, all the way to London; so that, by raising the water from the sea to the highest point, it would flow to the metropolis without further trouble; and might be raised by steam to Birmingham, whence it would descend to Derby and Manchester. This would enable salt-water baths to be established in London, an object for which there was a company formed between twenty and thirty years ago. The principal question is, whether sea water could be turned to such an account, either for baths or agricultural purposes, as would pay the expense. Our agricultural chemists would soon determine this. In the mean time, we may notice the practice of preserving grass and clover in a green state in pits, by the aid of pressure and a little salt, lately come into use in Germany, as brewers' grains are about London. This will be one use, and a most important use it is; and salting spoiled hay or straw would be another. Irrigation with diluted sea-water would also be found beneficial. (See *Quart. Journ. Ag.*, Oct. 1843.)

The Distribution of filtered Sewer Water from our large towns might be effected all over the country, by similar means, along the railroads, and probably will be so in the course of another generation. At present it would not pay.—*Cond.*

Draining-Pipes are now made, which are adapted for carrying drains through loose sand, and which, indeed, may be used as an economical substitute for draining-tiles, and even for conveying water from one basin or pond to another. These pipes are "made by a machine, which every brick-maker can have constructed for a very few pounds. It is merely an imitation of that by which macaroni is made in Italy. A quantity of well-tempered clay is put into a wooden or iron cylinder, in the bottom of which is an iron plate or disk, in which the exact section of the pipe is cut out; a strong piston, forced down by any simple machinery, drives out the pipe, which is received on a wooden mould, set perpendicularly, of the size of the bore of the pipe, having a shoulder and handle at the bottom. When the pipe is 13 in. long, it is cut off with a wire; a boy seizes the handle of the mould with the pipe on it, and places the pipe on a barrow with a flat stage on it, which, when full, is wheeled away. At the moment the first boy removes the mould, another boy places another vertically, to receive the next pipe. One cylinder, when filled, will squeeze out twelve pipes, or more; it is then removed to be filled again, while it is replaced by a full one. With a little practice, the operations go on most rapidly, and the greatest portion of the labour of moulding pipes and bending them is saved. We have no doubt that, with fair competition, pipes 2 or 3 inches in interior diameter may be thus made and burned, where fuel is moderately cheap, for less than 20*s.* a thousand, and larger in proportion. (*Gard. Chron.* for 1843, p. 659.)

Forcing Hyacinths so as to bloom at Christmas.—To do proper justice to forced hyacinths expected to bloom at Christmas, they ought to be potted not later than the middle of August. It is true we manage to flower them as early as Christmas, after potting them as late as the end of September and beginning of October; but this is too much for the bulbs; the flowers are not as fine as from early potting, and it takes two seasons' good nursing to bring them round again, so that they will make their appearance among the early spring bulbs in the beds and borders of the flower-garden. They manage differently in Holland, where they know the nature of the plant so much better than we do, especially as exemplified in our practice. There, from time out of mind, the first crop of forcing hyacinths is potted about the first week in August. They provide against exciting the foliage till the pots are full of roots, by a thick covering of tan, leaf-mould, or something of the kind. In about six weeks the pots are full of roots; they are then taken to cold-frames, and kept close to the glass, with plenty of air; and the natural warmth of the latter part of September and the whole of October is sufficient to bring up the foliage and flower-buds very gradually, with the least possible injury to the bulbs; indeed, as compared with our practice, their bulbs can hardly be said to be forced at all; and, after one season's nursing, the same bulbs are fit to be again forced, or exported in the usual course of business. If one party can procure these bulbs thus early, there is no reason why the whole trade should not be as early in the market, and save themselves and their customers much trouble. (*D. Beaton*, in *Gard. Chron.* for Aug. 19. 1843, p. 576.)

Conservatory Climbers. — At this period, when people are busily engaged in planning out new modes of heating, and re-arranging houses, pits, &c., or in contemplating new ones, let me suggest a simple, cheap, and efficient mode of rendering the conservatory superior to, and more interesting than, anything that has hitherto been done, with the exception of a few instances, which proved highly successful. It is, to clothe the rafters with the best stove and half-stove climbers for seven or eight months in the year, and thus to impart to it all the character and importance of an exotic stove, with the cool refreshing atmosphere suitable for conservatory plants, where those who cannot endure the broiling heat of the former may enjoy this luxury in a more congenial climate. Something of this kind seems now to be wanted, seeing that the better and more delicate greenhouse climbers are being encouraged as dwarf plants on trelliswork, a plan very suitable to tender and small flowering plants, but which does away altogether with our ideas of the bold unrestrained freedom of a fine climber; and also that the stronger greenhouse climbers are now turned out against conservatory walls, so that we are left in the dilemma of having the same kinds of climbers in the conservatory as against the hot walls in the open air, or we must contrive to grow others in-doors more suitable to our tastes and ideas, or, at all events, more in accordance with the higher branches of gardening. The plan which I propose for effecting this change is exceedingly simple, and not at all expensive, having had a less economical mode for the same purpose in operation for some years, and I can speak confidently as to the result. This plan is simply to build a narrow pit along the back of the conservatory, or along one end of it, if that is not in sight of the main walks; to keep up a constant stove-heat in this pit, to plant out stove-climbers in it, and, when they are of sufficient length, to introduce them through holes pierced in the back wall of the conservatory; or, more in detail, to build a pit 6 ft. wide and 4 ft. high, the whole length or breadth of the conservatory, as the case may be, with glass sashes in the usual way, at an angle sufficient to leave you head-room along a path next the back wall of the conservatory. This path may be 2 ft. wide, leaving room for a bed 4 ft. wide, except the 4-inch wall along the path to keep up the soil. This bed is to be made after the manner of a vine border, well drained, with a layer of rough stones over the drainage, and a good portion of them mixed with fresh turfy loam and a little peat and leaf-mould, to the depth of 3 ft. If you wish to try the effect of bottom-heat, nothing is easier than to run a trough under the drainage, with a two-inch pipe, to heat the water after the manner of Mr. Green's pits. Mr. Rendle's plan will not answer this purpose. A common flue may be the mode of heating if you want to go the cheapest way to work, and the heat may be from 75° to 85° in summer, and from 50° to 55° in winter. (*D. Beaton*, in *Gard. Chron.* for 1843, p. 588.)

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ART. II. *Domestic Notices.*

ENGLAND.

BOWOOD, in Wiltshire, the seat of the Marquess of Lansdowne. To all who are fond of garden scenes, in the great style of Brown's finest works, Bowood will afford considerable amusement. The water scenes form the finest features of the place. For one idea, the imitation of a vast river, Blenheim is superior; but as a lake, this has, I think, the advantage; the expanse of water is more varied; the accompaniment of hanging woods, varied groves, and cultivated slopes, far richer and more animated. Some scenes are truly Elysian, and present such an assemblage of the richest features of picturesque ground, that I know no place where they may be studied to more advantage. (*Young's Annals of Agriculture*, vol. viii. p. 79.)

SCOTLAND.

Glasgow Cathedral saved by a Gardener. — When the fanatics, in the year 1567, came to pull down the cathedral of Glasgow, a gardener, who stood by, said: "My friends, cannot you make it a house for serving your God in your own way? For it would cost your country a great deal to build such another." The fanatics desisted; and it is the only cathedral in Scotland that remains entire, and fit for service. (*Earl of Buchan's Life of Andrew Fletcher*, p. 41.)

ART. III. *Obituary.*

DEATH of Mr. Robert Lymburn. — It is with deep regret that we have heard of the sudden death of this excellent man. Mr. Lymburn had been poorly for some months past, but appeared to have got well again. He had recently buried his mother, with whom he had lived all his life; and he had just formed a partnership with Mr. Dreghorn, in the nursery business, at Kilmarnock. He retired to rest, in his usual health, on Monday the 30th of October last, and on the morning of Tuesday the 31st was found dead in his bed; the result, it is supposed, of an affection of the heart.

Mr. Lymburn was, perhaps, one of the best vegetable physiologists that Scotland ever produced. To an extensive practical knowledge of all the horticultural and agricultural practices of the country, he joined a thorough knowledge of chemistry, and of the functions of plants; and he was so thoroughly devoted to the subject, that he had no other recreation. As a proof, we have only to refer to his excellent articles in this Magazine; and to many papers of his in the *Gardener's Chronicle*. Fortunately for our readers, the MS. of the whole of the article on Comparative Physiology was received from Mr. Lymburn more than a month ago, and it will appear in the early Numbers of our succeeding Volume. Mr. Lymburn appeared to be about fifty years of age. Some of his townsmen and contemporaries will, we trust, furnish us with a biographical notice in greater detail. — *Cond.*

ERRATA.

Delete Beatònia atràta *Herb.*, and the description, in p. 624.

In p. 581., line 24. from bottom, *for* "Cumberland," read "Westmoreland."

See also p. 89, p. 90., and p. 459.

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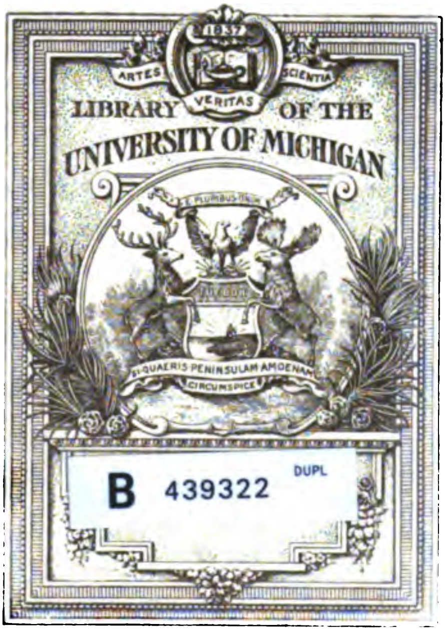

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